

UPPER RIO GRANDE WATER OPERATION MODEL

PHYSICAL MODEL APPENDIX (PHYGRAPH)

Contents

RIO CHAMA	1
UPPER RIVER.....	1
MIDDLE VALLEY	1
LOWER VALLEY	1
Graph 1. Comparison of routing methods, November 1963.	2
Graph 2. Comparison of routing methods, November 1967.	3
Graph 3. Comparison of routing methods, March - April 1968.	4
Graph 4. Comparison of routing methods, May 1970.	5
Graph 5. Comparison of routing methods, October 1972.	6
Graph 6. Comparison of routing methods, July 1978.	7
Graph 7. Comparison of routing methods, July 1981.	8
Graph 8. Comparison of routing methods, June 1971.	9
Graph 9. Cross section area versus discharge, Rio Chama above Abiquiu Reservoir...	10
Graph 10. Travel time versus discharge, Rio Chama below El Vado Dam to above Abiquiu Reservoir (based on gage above Abiquiu Reservoir).	10
Graph 11. Observed flow versus routed flow, filtered for losses, Rio Chama below El Vado Dam to above Abiquiu Reservoir, January 1962-96.	11
Graph 12. Observed flow versus routed flow, filtered for losses, Rio Chama below El Vado Dam to above Abiquiu Reservoir, February 1962-96.	11
Graph 13. Observed flow versus routed flow, filtered for losses, Rio Chama below El Vado Dam to above Abiquiu Reservoir, March 1962-96.	12
Graph 14. Observed flow versus routed flow, filtered for losses, Rio Chama below El Vado Dam to above Abiquiu Reservoir, April 1962-96.	12
Graph 15. Observed flow versus routed flow, filtered for losses, Rio Chama below El Vado Dam to above Abiquiu Reservoir, May 1962-96.	13
Graph 16. Observed flow versus routed flow, filtered for losses, Rio Chama below El Vado Dam to above Abiquiu Reservoir, June 1962-96.	13
Graph 17. Observed flow versus routed flow, filtered for losses, Rio Chama below El Vado Dam to above Abiquiu Reservoir, July 1962-96.	14
Graph 18. Observed flow versus routed flow, filtered for losses, Rio Chama below El Vado Dam to above Abiquiu Reservoir, August 1962-96.	14
Graph 19. Observed flow versus routed flow, filtered for losses, Rio Chama below El Vado Dam to above Abiquiu Reservoir, September 1962-96.	15
Graph 20. Observed flow versus routed flow, filtered for losses, Rio Chama below El Vado Dam to above Abiquiu Reservoir, October 1962-96.	15
Graph 21. Observed flow versus routed flow, filtered for losses, Rio Chama below El Vado Dam to above Abiquiu Reservoir, November 1962-96.	16
Graph 22. Observed flow versus routed flow, filtered for losses, Rio Chama below El Vado Dam to above Abiquiu Reservoir, December 1962-96.	16
Graph 23. Cross section area versus discharge, Rio Chama below Abiquiu Dam.	17

Graph 24. Cross section area versus discharge, Rio Chama near Chamita.	17
Graph 25. Travel time versus discharge, Rio Chama below Abiquiu Dam to near Chamita (based on gage below Abiquiu Dam).	18
Graph 26. Travel time versus discharge, Rio Chama below Abiquiu Dam to near Chamita (based on gage near Chamita).	18
Graph 27. Observed flow versus routed flow, filtered for losses, Rio Chama below Abiquiu Dam to near Chamita, January 1973-96.	19
Graph 28. Observed flow versus routed flow, filtered for losses, Rio Chama below Abiquiu Dam to near Chamita, February 1973-96.	19
Graph 29. Observed flow versus routed flow, filtered for losses, Rio Chama below Abiquiu Dam to near Chamita, March 1973-96.	20
Graph 30. Observed flow versus routed flow, filtered for losses, Rio Chama below Abiquiu Dam to near Chamita, April 1973-96.	20
Graph 31. Observed flow versus routed flow, filtered for losses, Rio Chama below Abiquiu Dam to near Chamita, May 1973-96.	21
Graph 32. Observed flow versus routed flow, filtered for losses, Rio Chama below Abiquiu Dam to near Chamita, June 1973-96.	21
Graph 33. Observed flow versus routed flow, filtered for losses, Rio Chama below Abiquiu Dam to near Chamita, July 1973-96.	22
Graph 34. Observed flow versus routed flow, filtered for losses, Rio Chama below Abiquiu Dam to near Chamita, August 1973-96.	22
Graph 35. Observed flow versus routed flow, filtered for losses, Rio Chama below Abiquiu Dam to near Chamita, September 1973-96.	23
Graph 36. Observed flow versus routed flow, filtered for losses, Rio Chama below Abiquiu Dam to near Chamita, October 1973-96.	23
Graph 37. Observed flow versus routed flow, filtered for losses, Rio Chama below Abiquiu Dam to near Chamita, November 1973-96.	24
Graph 38. Observed flow versus routed flow, filtered for losses, Rio Chama below Abiquiu Dam to near Chamita, December 1973-96.	24
Graph 39. Cross section area versus discharge, Rio Grande near Lobatos, Colorado. .	25
Graph 40. Cross section area versus discharge, Rio Grande near Cerro, NM.	25
Graph 41. Travel time versus discharge, Rio Grande near Lobatos, Colorado to near Cerro, New Mexico (based on gage near Lobatos).	26
Graph 42. Travel time versus discharge, Rio Grande near Lobatos, Colorado to near Cerro, New Mexico (based on gage near Cerro).	26
Graph 43. Cross section area versus discharge, Rio Grande below Taos Junction Bridge, near Taos.	27
Graph 44. Travel time versus discharge, Rio Grande near Cerro to below Taos Junction Bridge, near Taos (based on gage near Cerro).	27
Graph 45. Travel time versus discharge, Rio Grande near Cerro to below Taos Junction Bridge, near Taos (based on gage near Arroyo Hondo).	28
Graph 46. Travel time versus discharge, Rio Grande near Cerro to below Taos Junction Bridge, near Taos (based on gage below Taos Junction Bridge, near Taos).	28
Graph 47. Cross section area versus discharge, Rio Grande near Arroyo Hondo.	29
Graph 48. Travel time versus discharge, Rio Grande near Arroyo Hondo to below Taos Junction Bridge, near Taos (based on gage near Arroyo Hondo).	29

Graph 49. Travel time versus discharge, Rio Grande near Arroyo Hondo to below Taos Junction Bridge, near Taos (based on gage below Taos Junction Bridge, near Taos).	30
Graph 50. Observed flow versus routed flow, filtered for losses, Rio Grande near Arroyo Hondo to below Taos Junction Bridge, near Taos, January 1965-94.	30
Graph 51. Observed flow versus routed flow, filtered for losses, near Arroyo Hondo to below Taos Junction Bridge, near Taos, February 1965-94.....	31
Graph 52. Observed flow versus routed flow, filtered for losses, near Arroyo Hondo to below Taos Junction Bridge, near Taos, March 1965-94.	31
Graph 53. Observed flow versus routed flow, filtered for losses, Rio Grande near Arroyo Hondo to below Taos Junction Bridge, near Taos, April 1965-94.	32
Graph 54. Observed flow versus routed flow, filtered for losses, Rio Grande near Arroyo Hondo to below Taos Junction Bridge, near Taos, May 1965-94.....	32
Graph 55. Observed flow versus routed flow, filtered for losses, Rio Grande near Arroyo Hondo to below Taos Junction Bridge, near Taos, June 1965-94.....	33
Graph 56. Observed flow versus routed flow, filtered for losses, Rio Grande near Arroyo Hondo to below Taos Junction Bridge, near Taos, July 1965-94.....	33
Graph 57. Observed flow versus routed flow, filtered for losses, Rio Grande near Arroyo Hondo to below Taos Junction Bridge, near Taos, August 1965-94.	34
Graph 58. Observed flow versus routed flow, filtered for losses, Rio Grande near Arroyo Hondo to below Taos Junction Bridge, near Taos, September 1965-94.....	34
Graph 59. Observed flow versus routed flow, filtered for losses, Rio Grande near Arroyo Hondo to below Taos Junction Bridge, near Taos, October 1965-94.	35
Graph 60. Observed flow versus routed flow, filtered for losses, Rio Grande near Arroyo Hondo to below Taos Junction Bridge, near Taos, November 1965-94.....	35
Graph 61. Observed flow versus routed flow, filtered for losses, Rio Grande near Arroyo Hondo to below Taos Junction Bridge, near Taos, December 1965-94.....	36
Graph 62. Cross section area versus discharge, Rio Grande at Embudo.	36
Graph 63. Travel time versus discharge, Rio Grande below Taos Junction Bridge, near Taos to Embudo (based on gage below Taos Junction Bridge, near Taos).	37
Graph 64. Travel time versus discharge, Rio Grande below Taos Junction Bridge, near Taos to Embudo (based on gage at Embudo).	37
Graph 65. Observed flow versus routed flow, filtered for losses, Rio Grande below Taos Junction Bridge, near Taos to Embudo, January 1962-96.	38
Graph 66. Observed flow versus routed flow, filtered for losses, Rio Grande below Taos Junction Bridge, near Taos to Embudo, February 1962-96.....	38
Graph 67. Observed flow versus routed flow, filtered for losses, Rio Grande below Taos Junction Bridge, near Taos to Embudo, March 1962-96.	39
Graph 68. Observed flow versus routed flow, filtered for losses, Rio Grande below Taos Junction Bridge, near Taos to Embudo, April 1962-96.	39
Graph 69. Observed flow versus routed flow, filtered for losses, Rio Grande below Taos Junction Bridge, near Taos to Embudo, May 1962-96.	40
Graph 70. Observed flow versus routed flow, filtered for losses, Rio Grande below Taos Junction Bridge, near Taos to Embudo, June 1962-96.	40
Graph 71. Observed flow versus routed flow, filtered for losses, Rio Grande below Taos Junction Bridge, near Taos to Embudo, July 1962-96.	41
Graph 72. Observed flow versus routed flow, filtered for losses, Rio Grande below Taos Junction Bridge, near Taos to Embudo, August 1962-96.....	41

Graph 73. Observed flow versus routed flow, filtered for losses, Rio Grande below Taos Junction Bridge, near Taos to Embudo, September 1962-96.	42
Graph 74. Observed flow versus routed flow, filtered for losses, Rio Grande below Taos Junction Bridge, near Taos to Embudo, October 1962-96.	42
Graph 75. Observed flow versus routed flow, filtered for losses, Rio Grande below Taos Junction Bridge, near Taos to Embudo, November 1962-96.	43
Graph 76. Observed flow versus routed flow, filtered for losses, Rio Grande below Taos Junction Bridge, near Taos to Embudo, December 1962-96.	43
Graph 77. Cross section area versus discharge, Rio Grande above San Juan Pueblo.	44
Graph 78. Travel time versus discharge, Rio Grande at Embudo to above San Juan Pueblo (based on gage at Embudo).	44
Graph 79. Travel time versus discharge, Rio Grande at Embudo to above San Juan Pueblo (based on gage above San Juan Pueblo).	45
Graph 80. Observed flow versus routed flow, filtered for losses, Rio Grande at Embudo to above San Juan Pueblo, January 1976-86.	45
Graph 81. Observed flow versus routed flow, filtered for losses, Rio Grande at Embudo to above San Juan Pueblo, February 1976-86.	46
Graph 82. Observed flow versus routed flow, filtered for losses, Rio Grande at Embudo to above San Juan Pueblo, March 1976-86.	46
Graph 83. Observed flow versus routed flow, filtered for losses, Rio Grande at Embudo to above San Juan Pueblo, April 1976-86.	47
Graph 84. Observed flow versus routed flow, filtered for losses, Rio Grande at Embudo to above San Juan Pueblo, May 1976-86.	47
Graph 85. Observed flow versus routed flow, filtered for losses, Rio Grande at Embudo to above San Juan Pueblo, June 1976-86.	48
Graph 86. Observed flow versus routed flow, filtered for losses, Rio Grande at Embudo to above San Juan Pueblo, July 1976-86.	48
Graph 87. Observed flow versus routed flow, filtered for losses, Rio Grande at Embudo to above San Juan Pueblo, August 1976-86.	49
Graph 88. Observed flow versus routed flow, filtered for losses, Rio Grande at Embudo to above San Juan Pueblo, September 1976-86.	49
Graph 89. Observed flow versus routed flow, filtered for losses, Rio Grande at Embudo to above San Juan Pueblo, October 1976-86.	50
Graph 90. Observed flow versus routed flow, filtered for losses, Rio Grande at Embudo to above San Juan Pueblo, November 1976-86.	50
Graph 91. Observed flow versus routed flow, filtered for losses, Rio Grande at Embudo to above San Juan Pueblo, December 1976-86.	51
Graph 92. Cross section area versus discharge, Rio Grande at Otowi Bridge.	51
Graph 93. Travel time versus discharge, Rio Grande above San Juan Pueblo to Otowi Bridge (based on gage above San Juan Pueblo).	52
Graph 94. Travel time versus discharge, Rio Grande above San Juan Pueblo to Otowi Bridge (based on gage at Otowi Bridge).	52
Graph 95. Travel time versus discharge, Rio Grande at Otowi Bridge to below Cochiti Dam (based on gage at Otowi Bridge).	53
Graph 96. River-channel water surface area versus discharge, by reach, Rio Grande below Cochiti Dam to Elephant Butte Reservoir.	53
Graph 97. Measured average depth versus gage height, Rio Grande below Cochiti Dam, 1980-96.	54

Graph 98. Measured average depth versus gage height, Rio Grande at San Felipe, September 1970 to December 1986.	54
Graph 99. Measured average depth versus gage height, Rio Grande at San Felipe, January 1997 to June 1999.	55
Graph 100. Measured average depth versus gage height, Rio Grande at Albuquerque, February 1970 to December 1986.	55
Graph 101. Measured average depth versus gage height, Rio Grande at Albuquerque, January 1987 to September 1998.	56
Graph 102. Measured average depth versus gage height, Rio Grande Floodway near Bernardo, June 1970 to July 1987.	56
Graph 103. Measured average depth versus gage height, Rio Grande Floodway near Bernardo, July 1987 to May 1996.	57
Graph 104. Measured average depth versus gage height, Rio Grande Floodway near Bernardo, May 1996 to July 1998.	57
Graph 105. Cross section area versus discharge, Rio Grande below Cochiti Dam.	58
Graph 106. Cross section area versus discharge, Rio Grande at San Felipe.	58
Graph 107. Travel time versus discharge, Rio Grande below Cochiti Dam to San Felipe (based on gage at San Felipe).	59
Graph 108. Cross section area versus discharge, Rio Grande at Albuquerque.	59
Graph 109. Travel time versus discharge, Rio Grande at San Felipe to Albuquerque (based on gage at Albuquerque).	60
Graph 110. Cross section area versus discharge, Rio Grande Floodway near Bernardo.	60
Graph 111. Travel time versus discharge, Rio Grande at Albuquerque to Floodway at Bernardo (based on gage at Albuquerque).	61
Graph 112. Cross section area versus discharge, Rio Grande Floodway at San Acacia.	61
Graph 113. Travel time versus discharge, Rio Grande Floodway near Bernardo to Floodway at San Acacia (based on gage Floodway at San Acacia).	62
Graph 114. Cross section area versus discharge, Jemez River near Jemez.	62
Graph 115. Travel time versus discharge, Jemez River near Jemez to Jemez Canyon Reservoir (based on gage near Jemez).	63
Graph 116. Observed flow versus routed flow, filtered for losses, Jemez River near Jemez to Jemez Canyon Reservoir, January 1985-96.	63
Graph 117. Observed flow versus routed flow, filtered for losses, Jemez River near Jemez to Jemez Canyon Reservoir, February 1985-96.	64
Graph 118. Observed flow versus routed flow, filtered for losses, Jemez River near Jemez to Jemez Canyon Reservoir, March 1985-96.	64
Graph 119. Observed flow versus routed flow, filtered for losses, Jemez River near Jemez to Jemez Canyon Reservoir, April 1985-96.	65
Graph 120. Observed flow versus routed flow, filtered for losses, Jemez River near Jemez to Jemez Canyon Reservoir, May 1985-96.	65
Graph 121. Observed flow versus routed flow, filtered for losses, Jemez River near Jemez to Jemez Canyon Reservoir, June 1985-96.	66
Graph 122. Observed flow versus routed flow, filtered for losses, Jemez River near Jemez to Jemez Canyon Reservoir, July 1985-96.	66
Graph 123. Observed flow versus routed flow, filtered for losses, Jemez River near Jemez to Jemez Canyon Reservoir, August 1985-96.	67

Graph 124. Observed flow versus routed flow, filtered for losses, Jemez River near Jemez to Jemez Canyon Reservoir, September 1985-96.	67
Graph 125. Observed flow versus routed flow, filtered for losses, Jemez River near Jemez to Jemez Canyon Reservoir, October 1985-96.	68
Graph 126. Observed flow versus routed flow, filtered for losses, Jemez River near Jemez to Jemez Canyon Reservoir, November 1985-96.	68
Graph 127. Observed flow versus routed flow, filtered for losses, Jemez River near Jemez to Jemez Canyon Reservoir, December 1985-96.	69
Graph 128. Cross section area versus discharge, Rio Grande Floodway at San Marcial.	69
Graph 129. Travel time versus discharge, Rio Grande Floodway at San Acacia to Floodway at San Marcial (based on gage Floodway at San Acacia).	70
Graph 130. Travel time versus discharge, Rio Grande Floodway at San Acacia to Floodway at San Marcial (based on gage Floodway at San Marcial).	70
Graph 131. Travel time versus discharge, Rio Grande Floodway at San Marcial to below Elephant Butte Reservoir.	71
Graph 132. Cross section area versus discharge, Rio Grande below Elephant Butte Dam, 1970-99.	72
Graph 133. Travel time versus discharge, Rio Grande below Elephant Butte Dam to Caballo Reservoir (based on gage below Elephant Butte Dam, 1970-99).	72
Graph 134. Observed flow versus routed flow, filtered for losses, Rio Grande below Elephant Butte Dam to Caballo Reservoir, January 1989-95.	73
Graph 135. Observed flow versus routed flow, filtered for losses, Rio Grande below Elephant Butte Dam to Caballo Reservoir, February 1989-95.	73
Graph 136. Observed flow versus routed flow, filtered for losses, Rio Grande below Elephant Butte Dam to Caballo Reservoir, March 1989-95.	74
Graph 137. Observed flow versus routed flow, filtered for losses, Rio Grande below Elephant Butte Dam to Caballo Reservoir, April 1989-95.	74
Graph 138. Observed flow versus routed flow, filtered for losses, Rio Grande below Elephant Butte Dam to Caballo Reservoir, May 1989-95.	75
Graph 139. Observed flow versus routed flow, filtered for losses, Rio Grande below Elephant Butte Dam to Caballo Reservoir, June 1989-95.	75
Graph 140. Observed flow versus routed flow, filtered for losses, Rio Grande below Elephant Butte Dam to Caballo Reservoir, July 1989-95.	76
Graph 141. Observed flow versus routed flow, filtered for losses, Rio Grande below Elephant Butte Dam to Caballo Reservoir, August 1989-95.	76
Graph 142. Observed flow versus routed flow, filtered for losses, Rio Grande below Elephant Butte Dam to Caballo Reservoir, September 1989-95.	77
Graph 143. Observed low flow versus routed low flow, filtered for losses, Rio Grande below Elephant Butte Dam to Caballo Reservoir, September - February 1989-95.	77
Graph 144. Cross section area versus discharge, Rio Grande below Caballo Dam.	78
Graph 145. Travel time versus discharge, Rio Grande below Caballo Dam to below Leasburg Dam (based on gage below Caballo Dam).	78
Graph 146. Observed flow versus routed flow, filtered for losses, Rio Grande below Caballo Dam to below Leasburg Dam, January 1986-99.	79
Graph 147. Observed flow versus routed flow, filtered for losses, Rio Grande below Caballo Dam to below Leasburg Dam, February 1986-99.	79

Graph 148. Observed flow versus routed flow, filtered for losses, Rio Grande below Caballo Dam to below Leasburg Dam, March 1986-99.	80
Graph 149. Observed flow versus routed flow, filtered for losses, Rio Grande below Caballo Dam to below Leasburg Dam, April 1986-99.	80
Graph 150. Observed flow versus routed flow, filtered for losses, Rio Grande below Caballo Dam to below Leasburg Dam, May 1986-99.	81
Graph 151. Observed flow versus routed flow, filtered for losses, Rio Grande below Caballo Dam to below Leasburg Dam, June 1986-99.	81
Graph 152. Observed flow versus routed flow, filtered for losses, Rio Grande below Caballo Dam to below Leasburg Dam, July 1986-99.	82
Graph 153. Observed flow versus routed flow, filtered for losses, Rio Grande below Caballo Dam to below Leasburg Dam, August 1986-99.	82
Graph 154. Observed flow versus routed flow, filtered for losses, Rio Grande below Caballo Dam to below Leasburg Dam, September 1986-99.	83
Graph 155. Observed flow versus routed flow, filtered for losses, Rio Grande below Caballo Dam to below Leasburg Dam, October 1986-99.	83
Graph 156. Observed flow versus routed flow, filtered for losses, Rio Grande below Caballo Dam to below Leasburg Dam, November - December 1986-99.	84
Graph 157. Cross section area versus discharge, Rio Grande below Mesilla Dam.	84
Graph 158. Travel time versus discharge, Rio Grande below Leasburg Dam to below Mesilla Dam (based on gage below Mesilla Dam).	85
Graph 159. Observed flow versus routed flow, filtered for losses, Rio Grande below Leasburg Dam to below Mesilla Dam, January 1985-98.	85
Graph 160. Observed flow versus routed flow, filtered for losses, Rio Grande below Leasburg Dam to below Mesilla Dam, February 1985-98.	86
Graph 161. Observed flow versus routed flow, filtered for losses, Rio Grande below Leasburg Dam to below Mesilla Dam, March 1985-98.	86
Graph 162. Observed flow versus routed flow, filtered for losses, Rio Grande below Leasburg Dam to below Mesilla Dam, April 1985-98.	87
Graph 163. Observed flow versus routed flow, filtered for losses, Rio Grande below Leasburg Dam to below Mesilla Dam, May 1985-98.	87
Graph 164. Observed flow versus routed flow, filtered for losses, Rio Grande below Leasburg Dam to below Mesilla Dam, June 1985-98.	88
Graph 165. Observed flow versus routed flow, filtered for losses, Rio Grande below Leasburg Dam to below Mesilla Dam, July 1985-98.	88
Graph 166. Observed flow versus routed flow, filtered for losses, Rio Grande below Leasburg Dam to below Mesilla Dam, August 1985-98.	89
Graph 167. Observed flow versus routed flow, filtered for losses, Rio Grande below Leasburg Dam to below Mesilla Dam, September 1985-98.	89
Graph 168. Observed flow versus routed flow, filtered for losses, Rio Grande below Leasburg Dam to below Mesilla Dam, October 1985-98.	90
Graph 169. Observed flow versus routed flow, filtered for losses, Rio Grande below Leasburg Dam to below Mesilla Dam, November 1985-98.	90
Graph 170. Observed flow versus routed flow, filtered for losses, Rio Grande below Leasburg Dam to below Mesilla Dam, December 1985-98.	91
Graph 171. Cross section area versus discharge, Rio Grande at El Paso, Texas.	91
Graph 172. Travel time versus discharge, Rio Grande below Mesilla Dam to El Paso (based on gage at El Paso).	92

Graph 173. Observed flow versus routed flow, filtered for losses, Rio Grande below Mesilla Dam to El Paso, January 1986-98.	92
Graph 174. Observed flow versus routed flow, filtered for losses, Rio Grande below Mesilla Dam to El Paso, February 1986-98.	93
Graph 175. Observed flow versus routed flow, filtered for losses, Rio Grande below Mesilla Dam to El Paso, March 1986-98.	93
Graph 176. Observed flow versus routed flow, filtered for losses, Rio Grande below Mesilla Dam to El Paso, April 1986-98.	94
Graph 177. Observed flow versus routed flow, filtered for losses, Rio Grande below Mesilla Dam to El Paso, May 1986-98.	94
Graph 178. Observed flow versus routed flow, filtered for losses, Rio Grande below Mesilla Dam to El Paso, June 1986-98.	95
Graph 179. Observed flow versus routed flow, filtered for losses, Rio Grande below Mesilla Dam to El Paso, July 1986-98.	95
Graph 180. Observed flow versus routed flow, filtered for losses, Rio Grande below Mesilla Dam to El Paso, August 1986-98.	96
Graph 181. Observed flow versus routed flow, filtered for losses, Rio Grande below Mesilla Dam to El Paso, November-January 1986-98.	96
Graph 182. Observed flow versus routed flow, filtered for losses, Rio Grande below Mesilla Dam to El Paso, February-October 1986-98.	97

APPENDIX A

This appendix contains the graphs used to analyze the data and develop the equations for river routing, channel losses, and other losses in the system. The graphs found in this appendix are referenced in the text of the main document, and the organization of this appendix follows the organization of the main document. The graphs in this appendix are organized in the following manner.

RIO CHAMA

Graphs 1-38 show the relations used to develop travel time lags and channel losses for reaches of the Rio Chama from below El Vado Dam to the Rio Chama confluence with the Rio Grande in the Española Valley.

UPPER RIVER

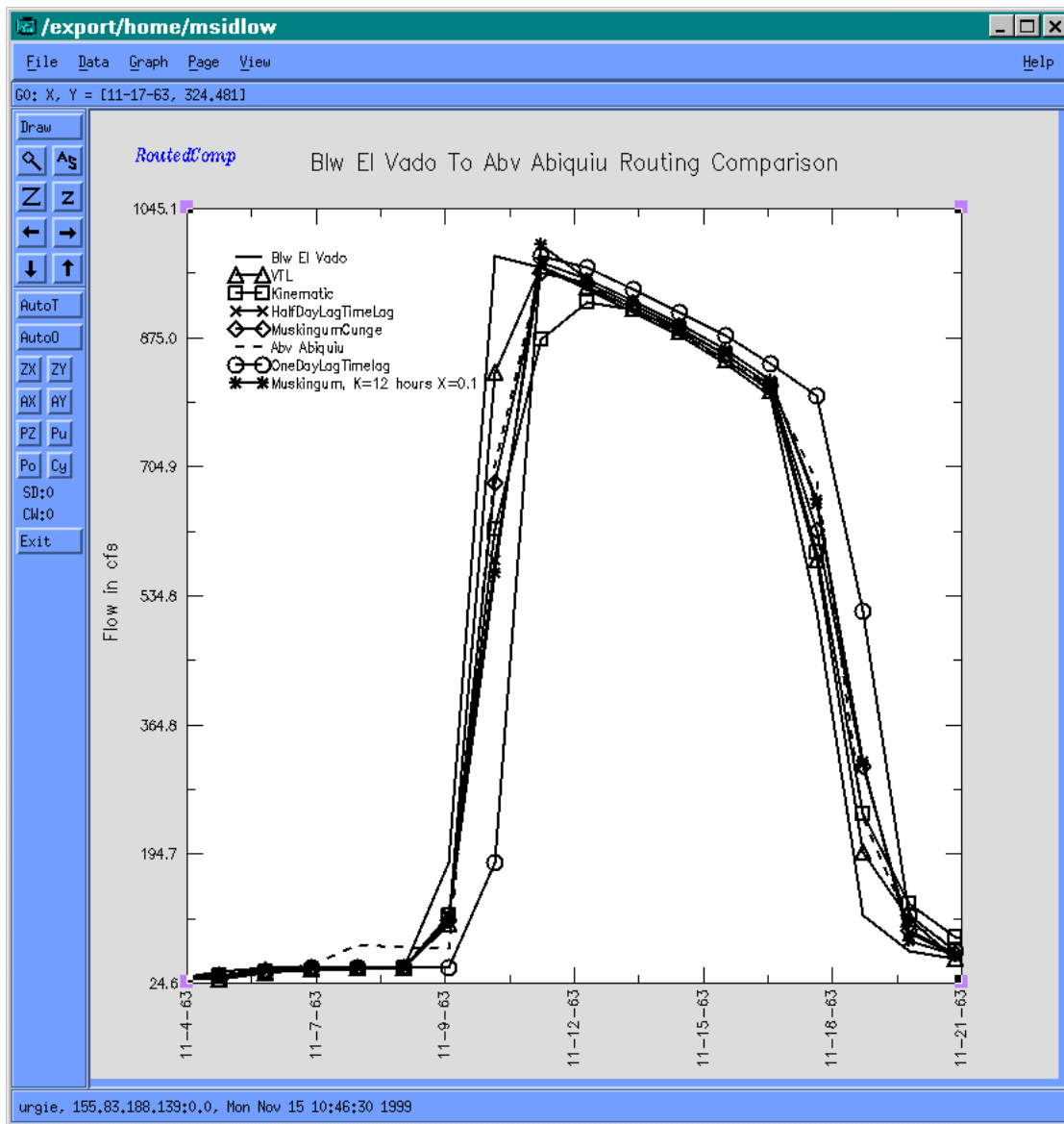
Graphs 39-95 show the relations used to develop travel time lags in the seven reaches of the Rio Grande from near Lobatos, Colorado to below Cochiti Dam. Because of the lack of reliable data available to develop these relations in all reaches, loss relations developed for certain reaches were applied to other reaches.

MIDDLE VALLEY

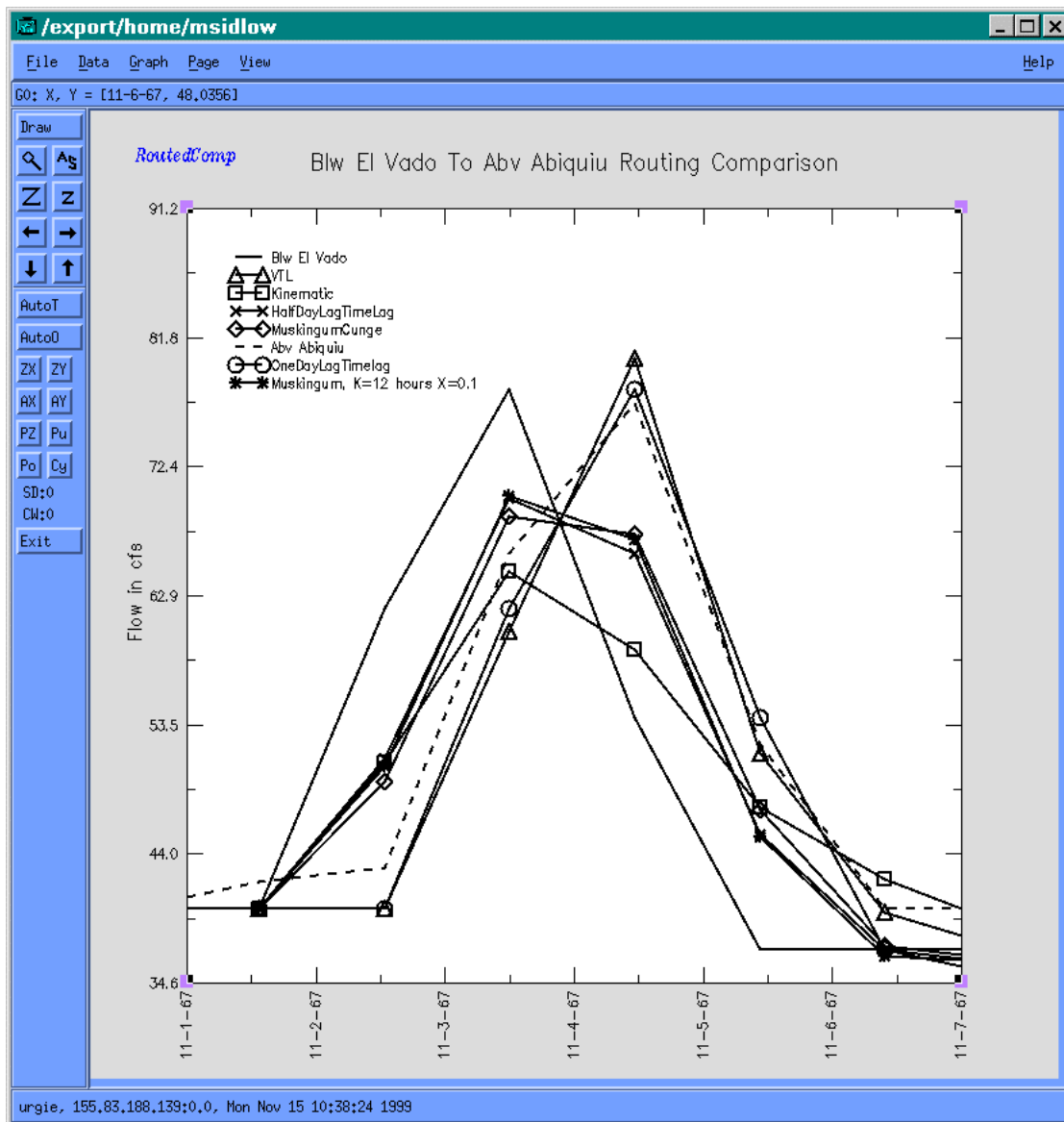
Graphs 96-113 show the relations used to develop travel time lags, river-channel water surface evaporation, and river-channel leakage for the reaches of the Rio Grande from below Cochiti Dam to the Rio Grande Floodway at San Acacia. Graphs 114 to 127 are those used to develop travel time lags and losses for the Jemez River. Graphs 128-143 are those used in developing travel time lags and the simplified loss determination procedures for the reaches of the Rio Grande from the Rio Grande Floodway at San Acacia to below Elephant Butte Reservoir.

LOWER VALLEY

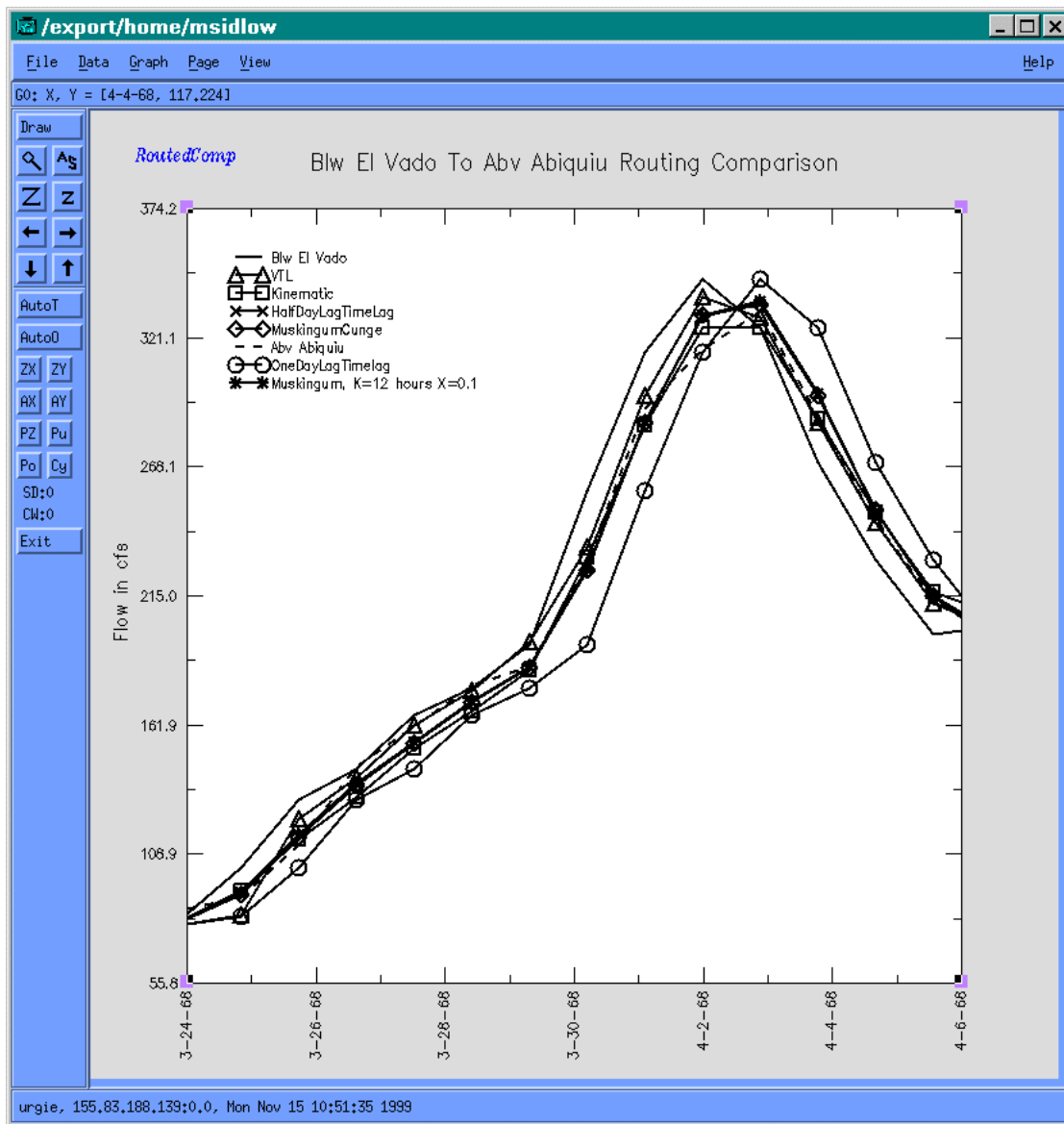
Graphs 144-180 show the relations used to develop travel time lags and channel losses for the three reaches of the Rio Grande from below Caballo Dam to El Paso, Texas.



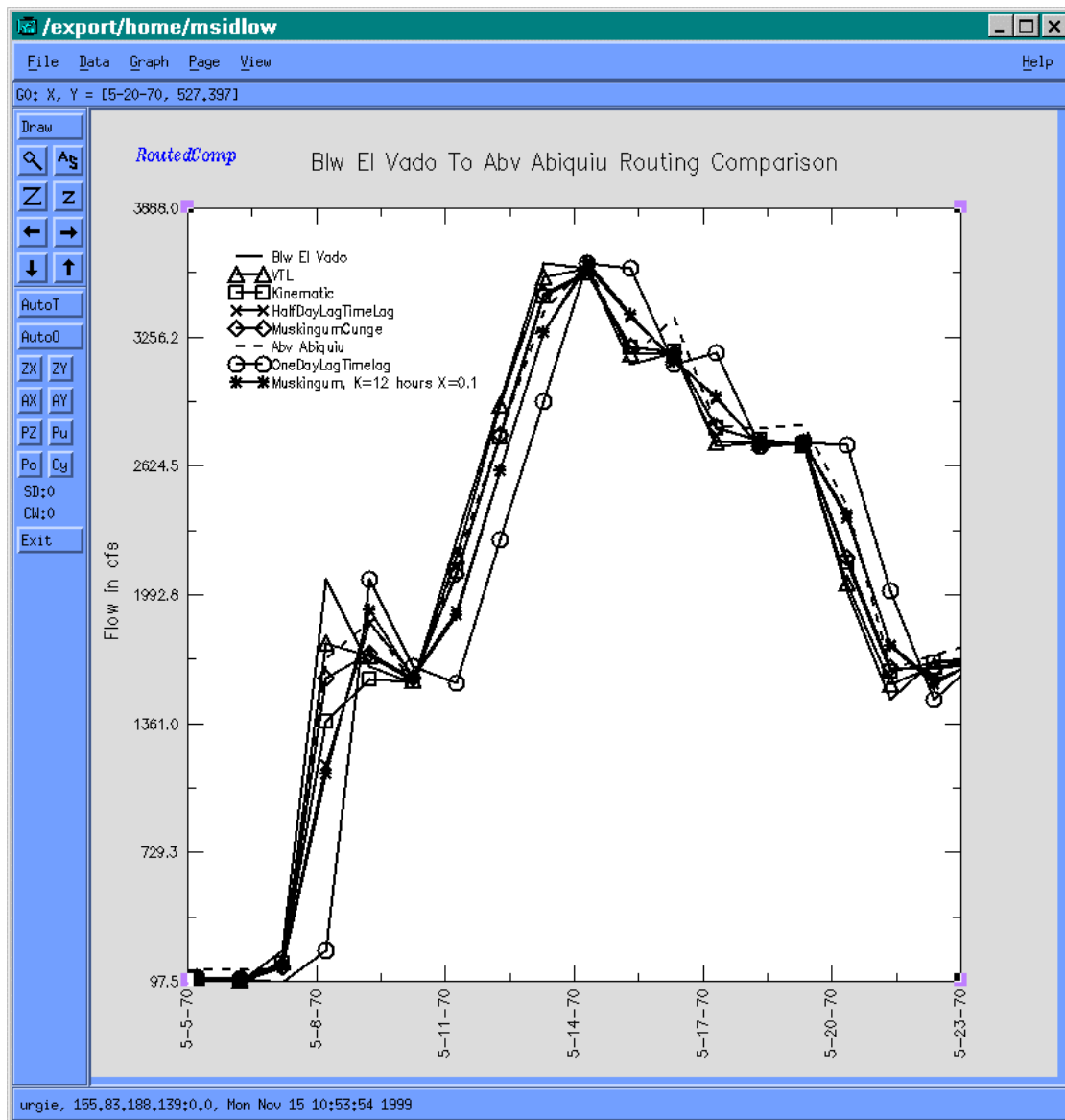
Graph 1. Comparison of routing methods, November 1963.



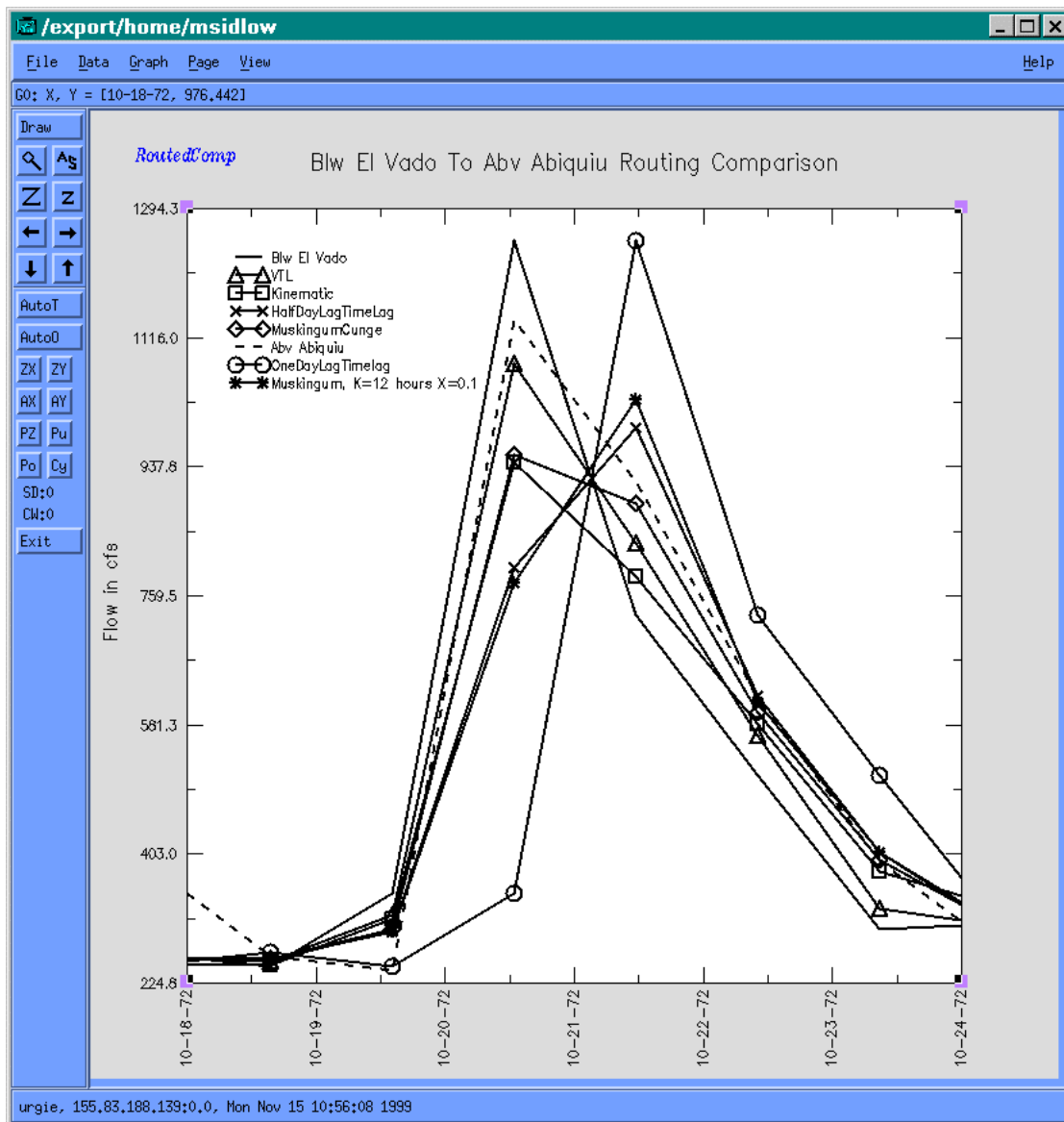
Graph 2. Comparison of routing methods, November 1967.



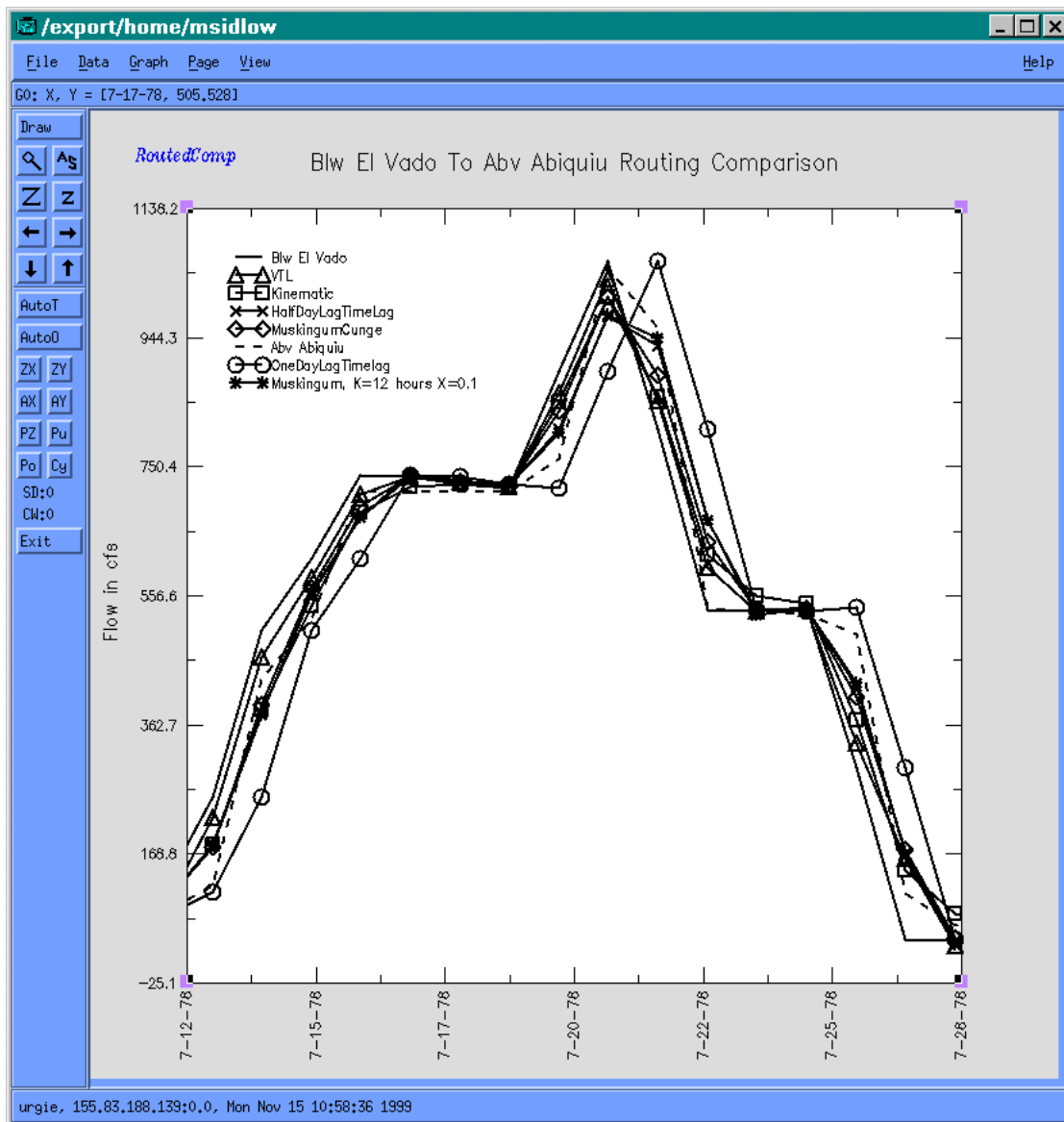
Graph 3. Comparison of routing methods, March - April 1968.



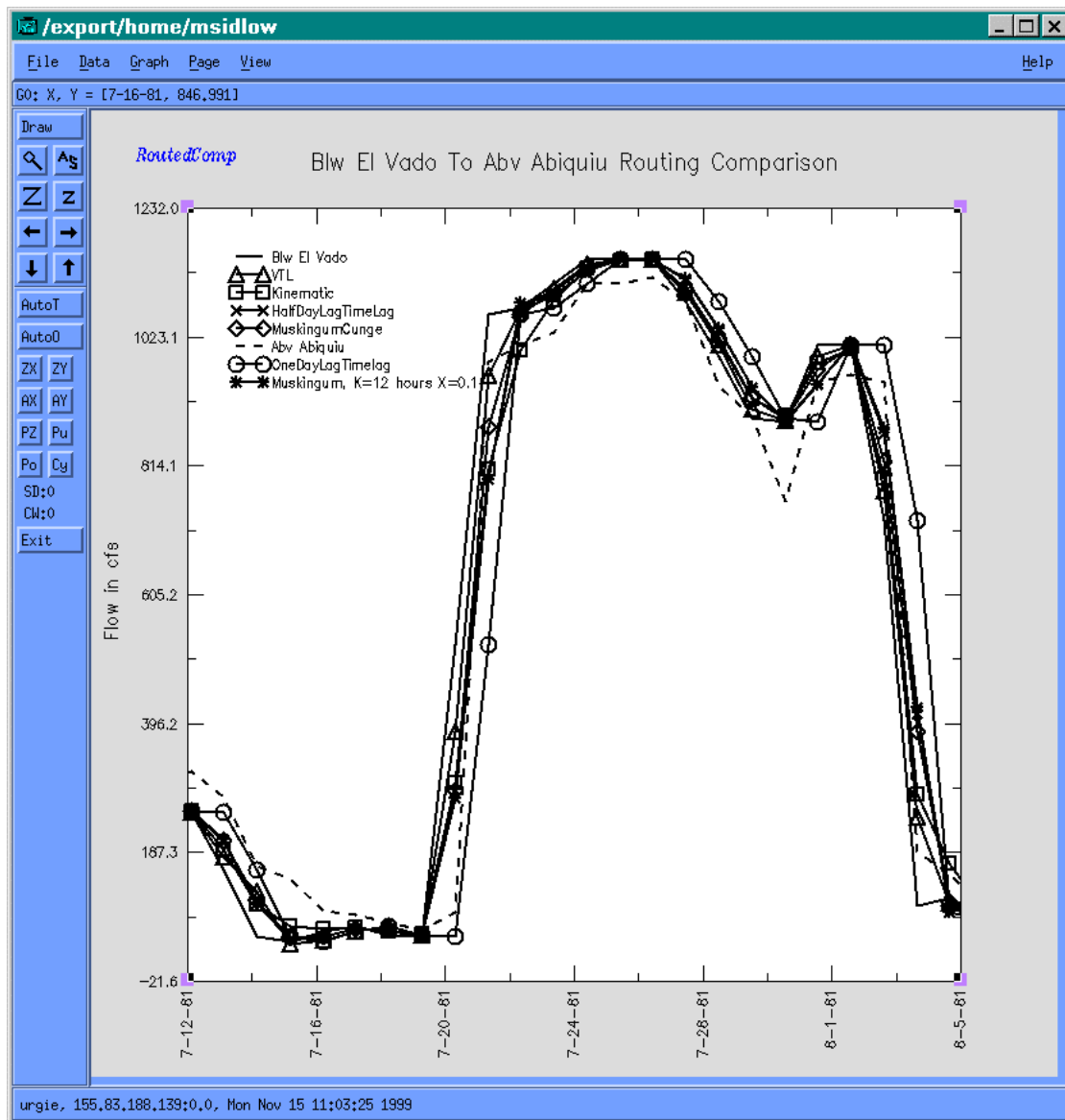
Graph 4. Comparison of routing methods, May 1970.



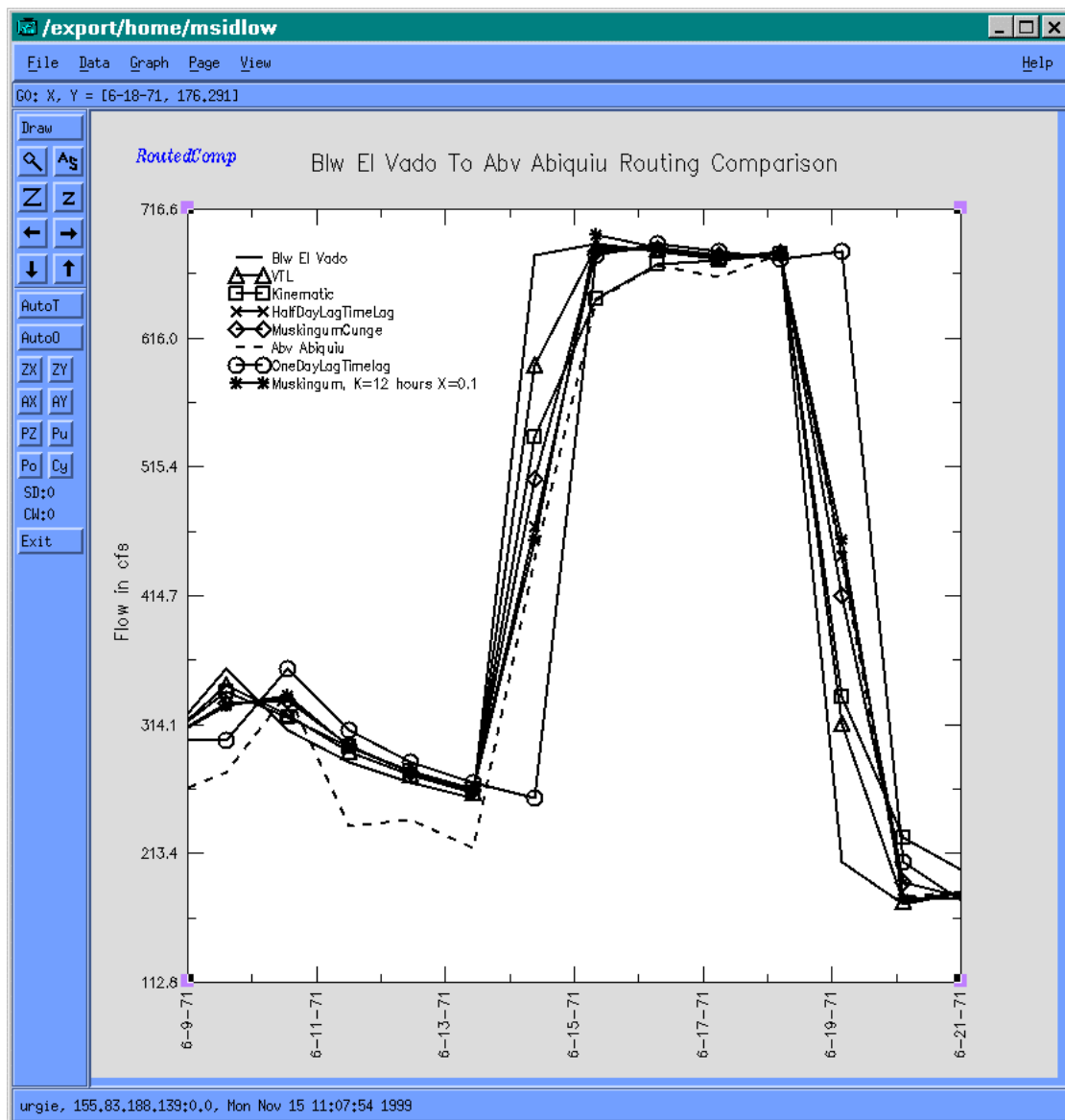
Graph 5. Comparison of routing methods, October 1972.



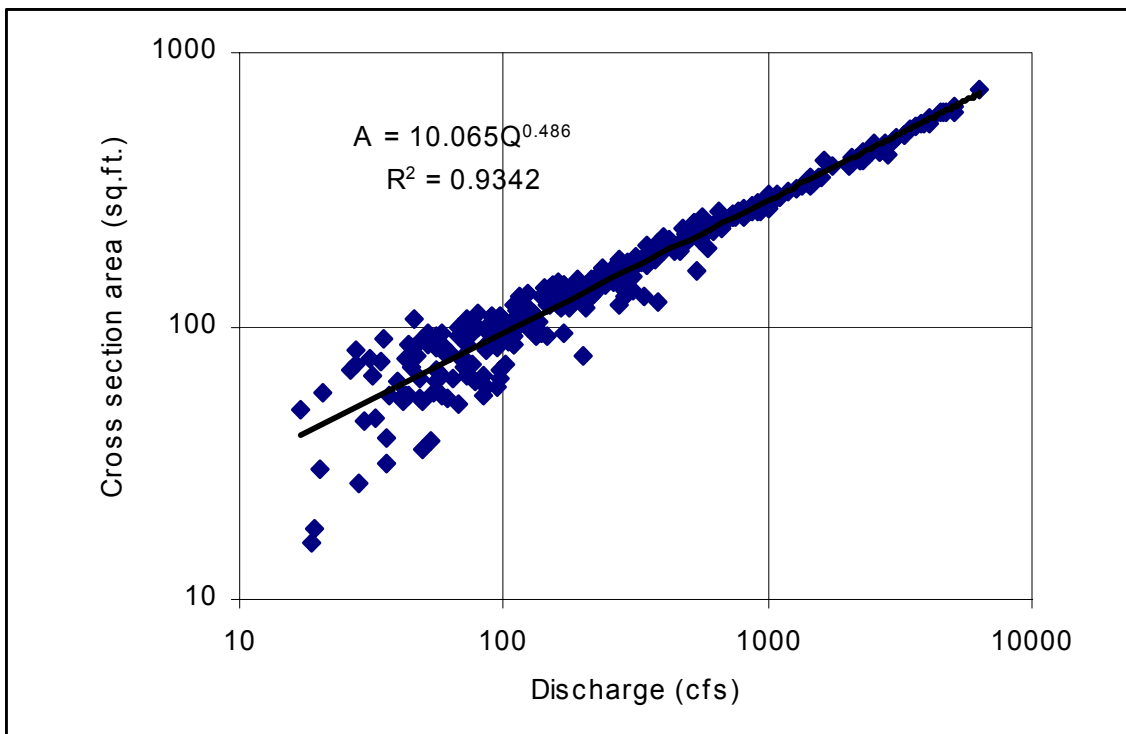
Graph 6. Comparison of routing methods, July 1978.



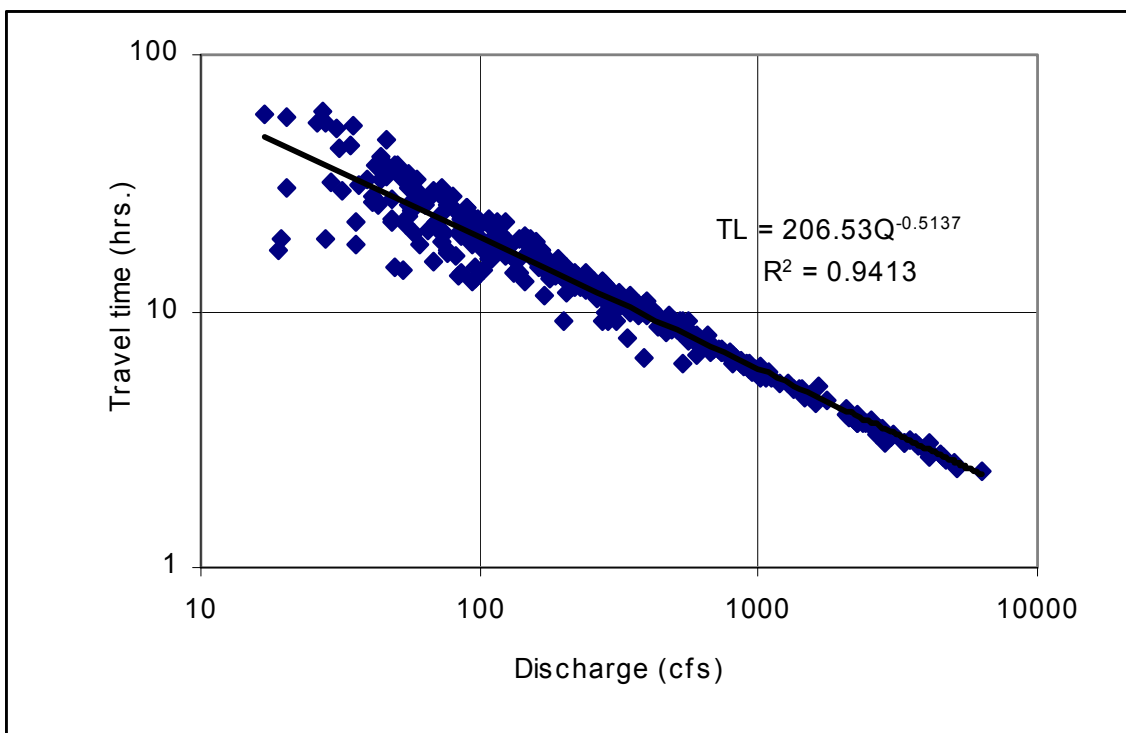
Graph 7. Comparison of routing methods, July 1981.



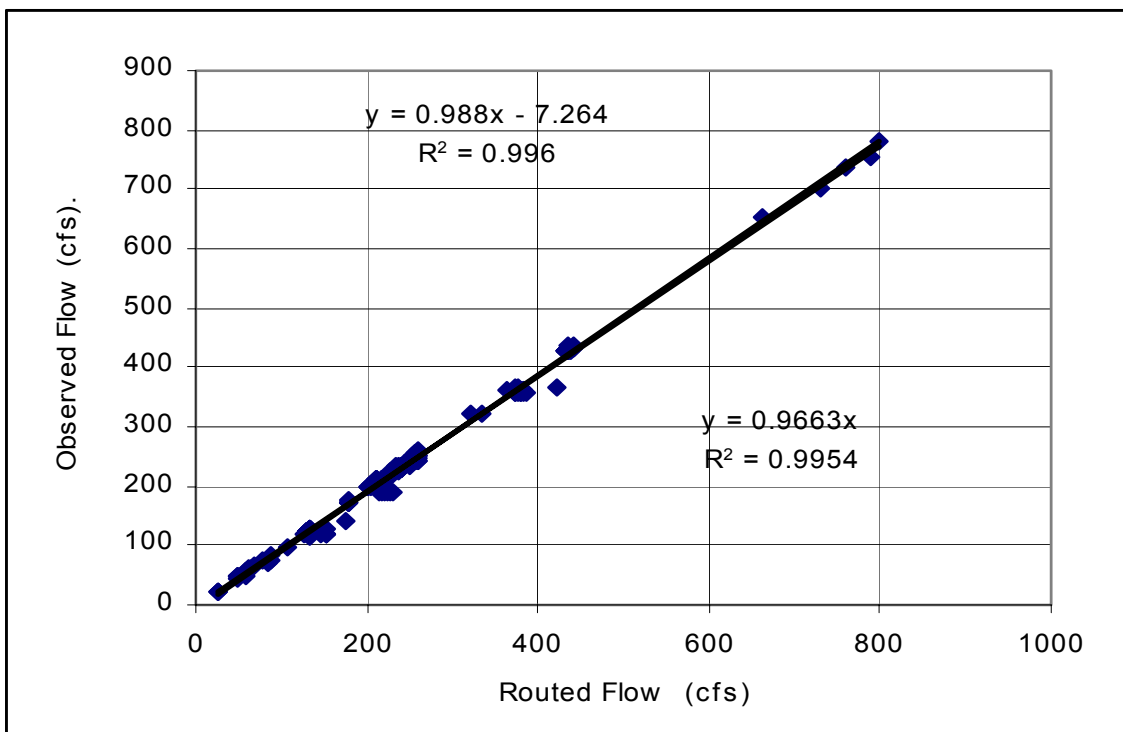
Graph 8. Comparison of routing methods, June 1971.



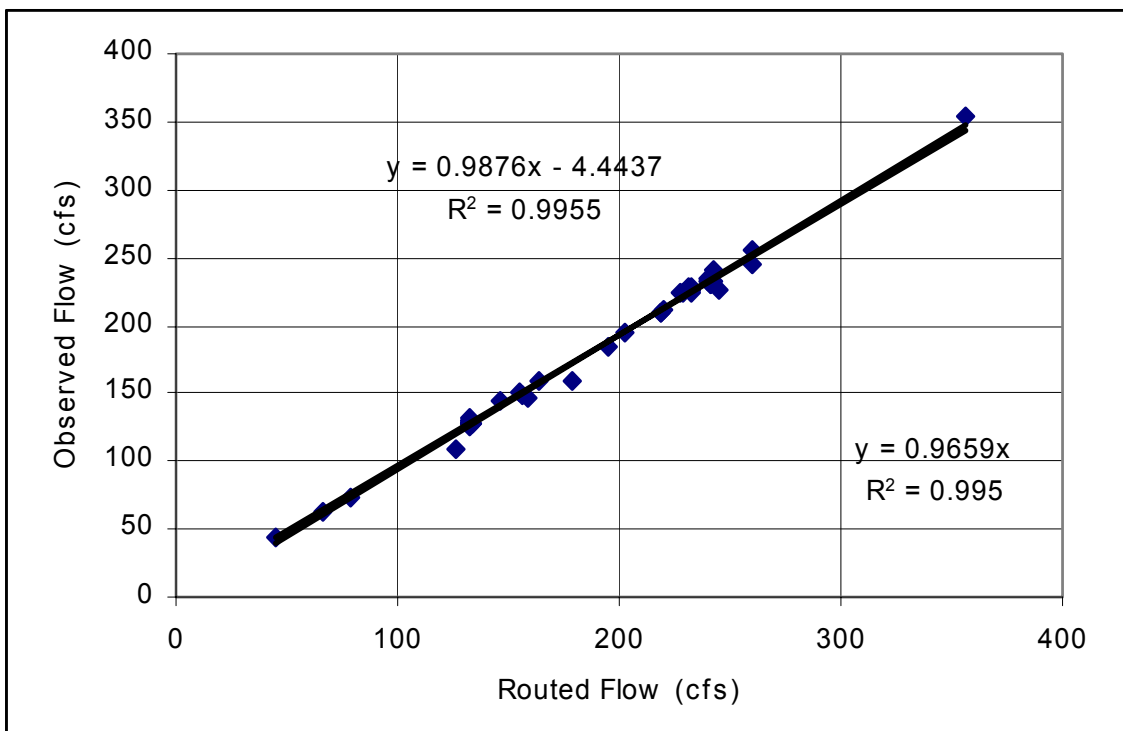
Graph 9. Cross section area versus discharge, Rio Chama above Abiquiu Reservoir.



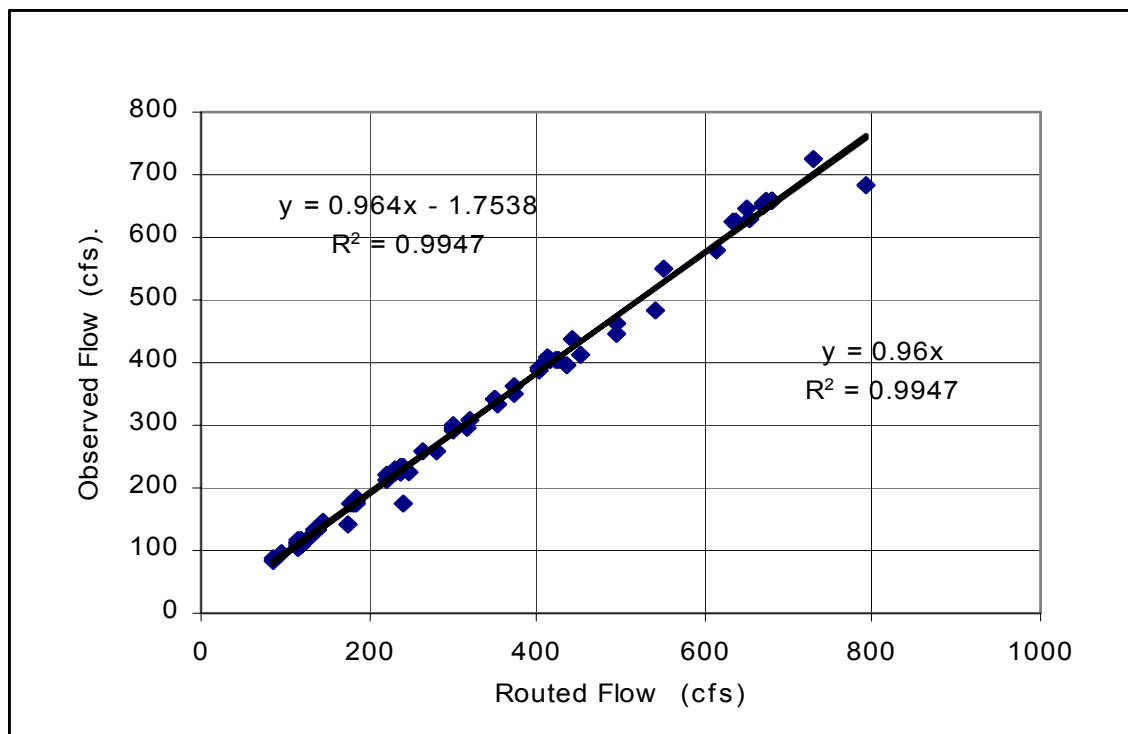
Graph 10. Travel time versus discharge, Rio Chama below El Vado Dam to above Abiquiu Reservoir (based on gage above Abiquiu Reservoir).



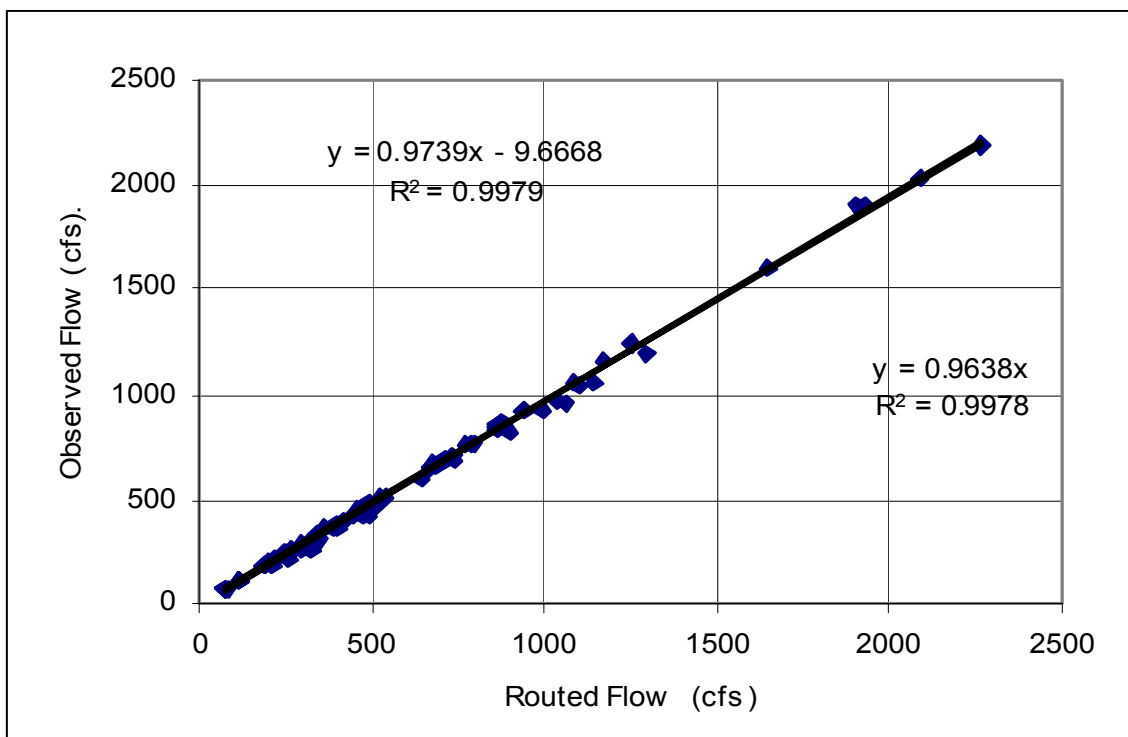
Graph 11. Observed flow versus routed flow, filtered for losses, Rio Chama below El Vado Dam to above Abiquiu Reservoir, January 1962-96.



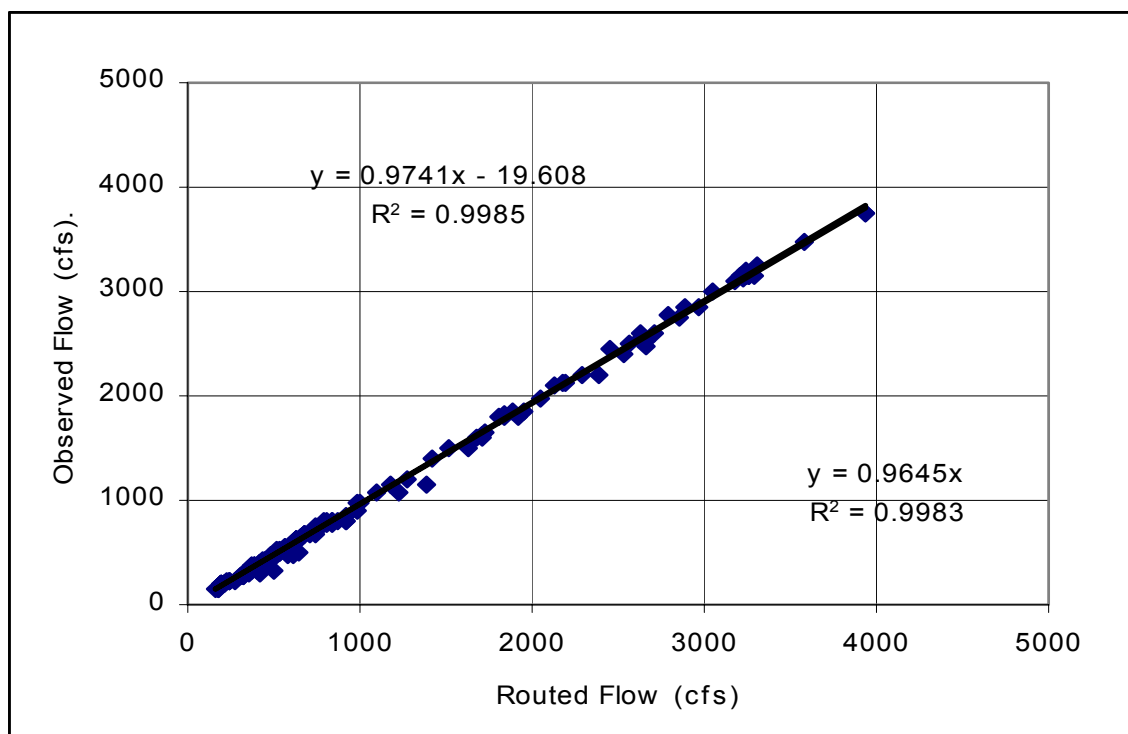
Graph 12. Observed flow versus routed flow, filtered for losses, Rio Chama below El Vado Dam to above Abiquiu Reservoir, February 1962-96.



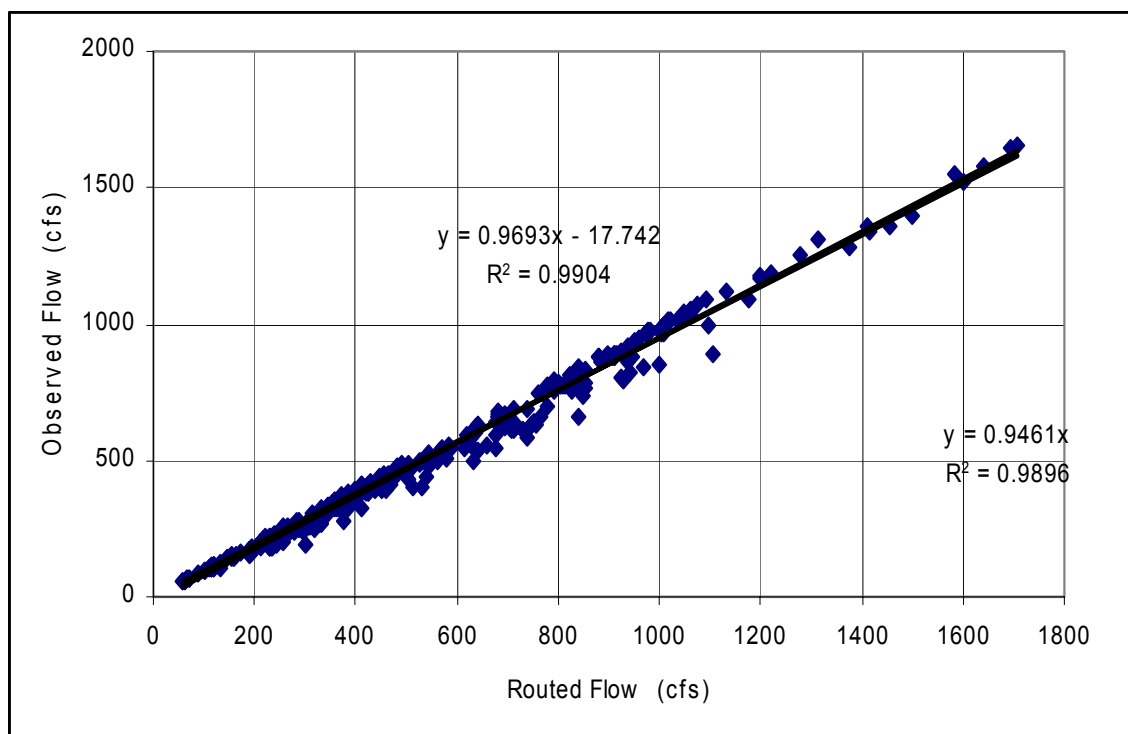
Graph 13. Observed flow versus routed flow, filtered for losses, Rio Chama below El Vado Dam to above Abiquiu Reservoir, March 1962-96.



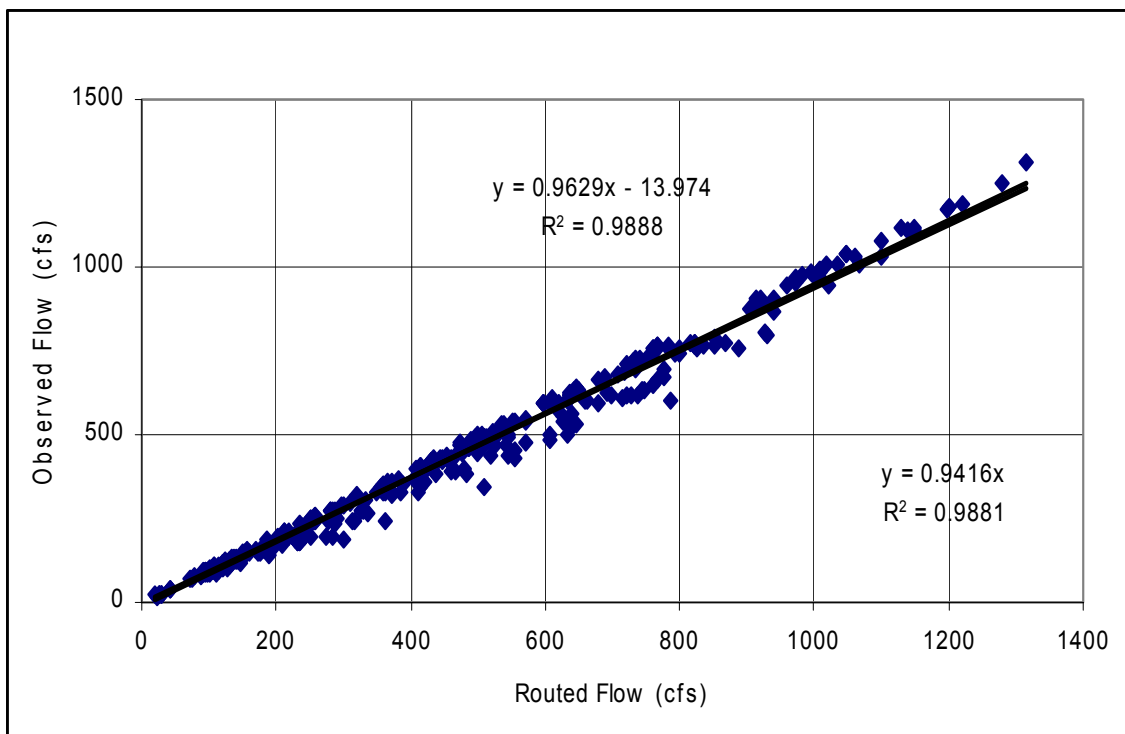
Graph 14. Observed flow versus routed flow, filtered for losses, Rio Chama below El Vado Dam to above Abiquiu Reservoir, April 1962-96.



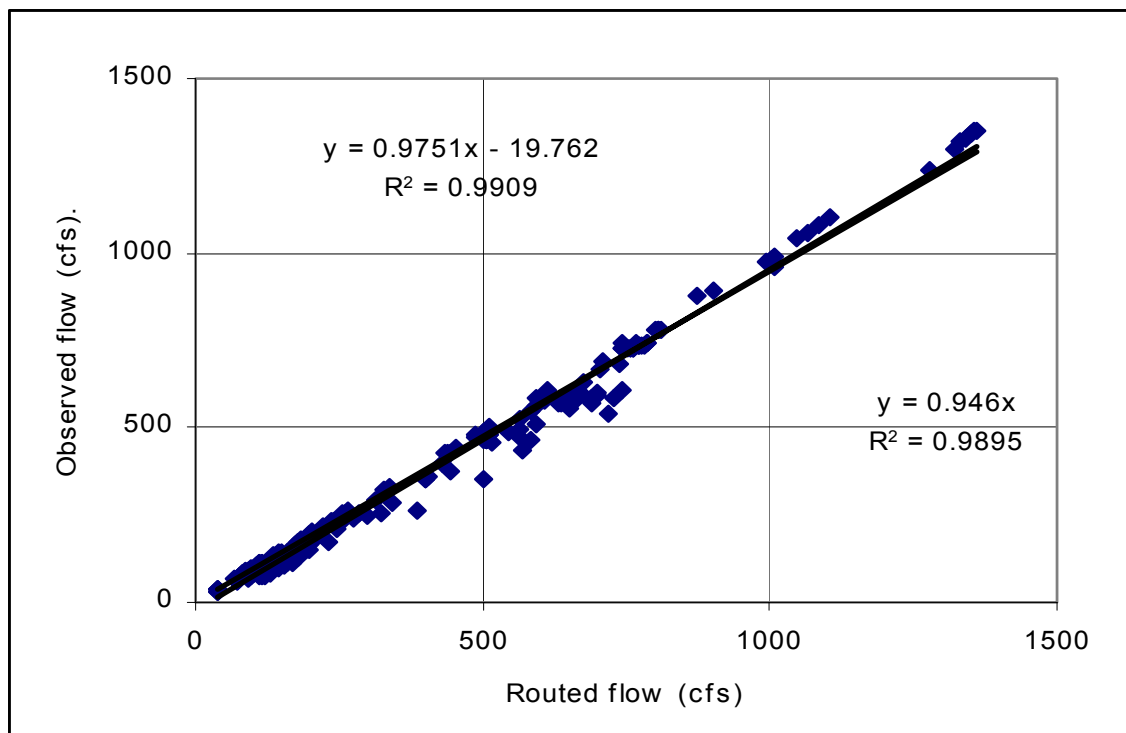
Graph 15. Observed flow versus routed flow, filtered for losses, Rio Chama below El Vado Dam to above Abiquiu Reservoir, May 1962-96.



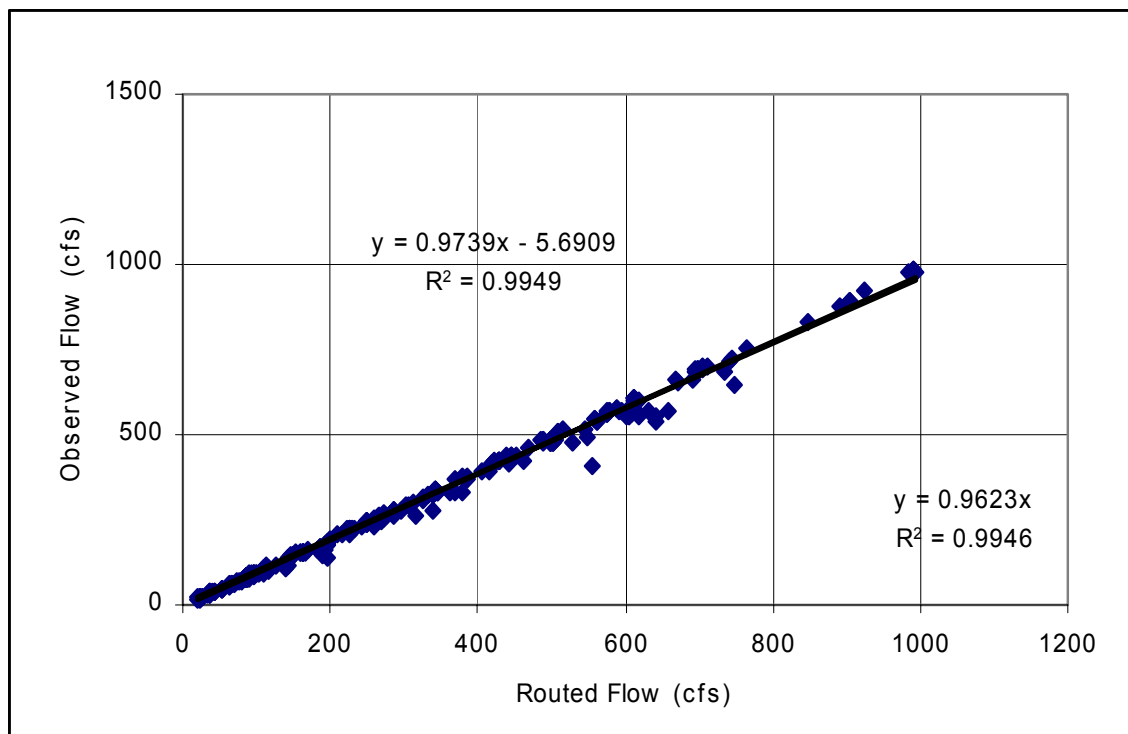
Graph 16. Observed flow versus routed flow, filtered for losses, Rio Chama below El Vado Dam to above Abiquiu Reservoir, June 1962-96.



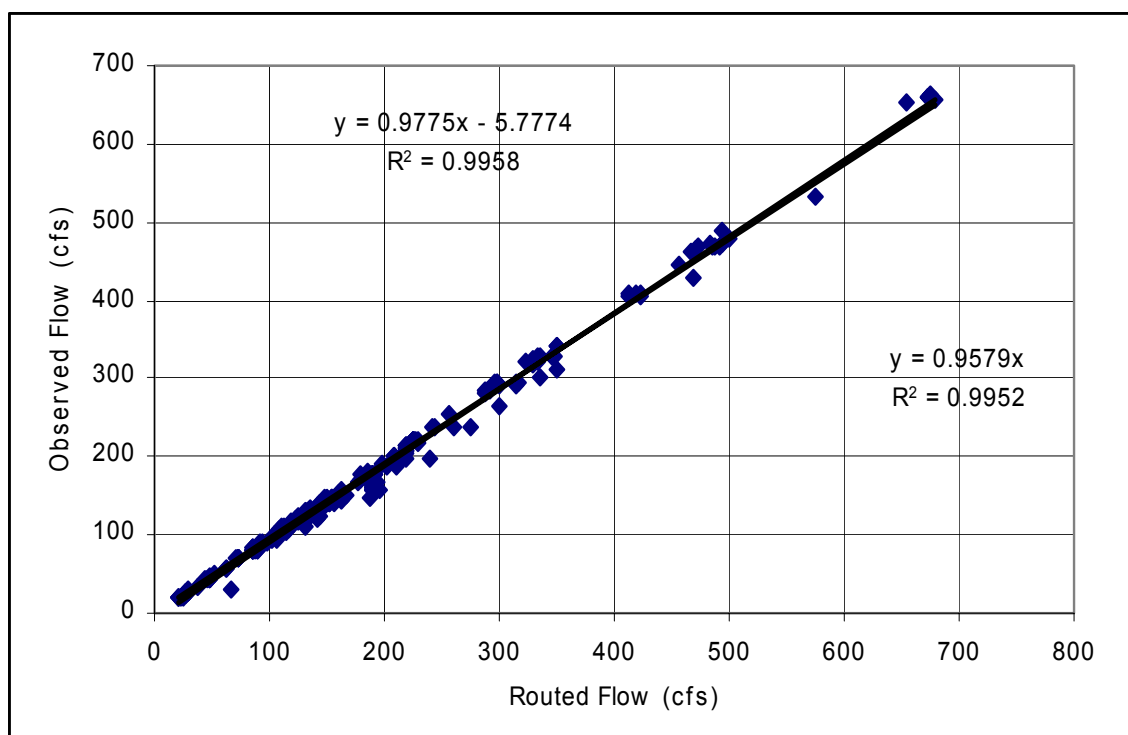
Graph 17. Observed flow versus routed flow, filtered for losses, Rio Chama below El Vado Dam to above Abiquiu Reservoir, July 1962-96.



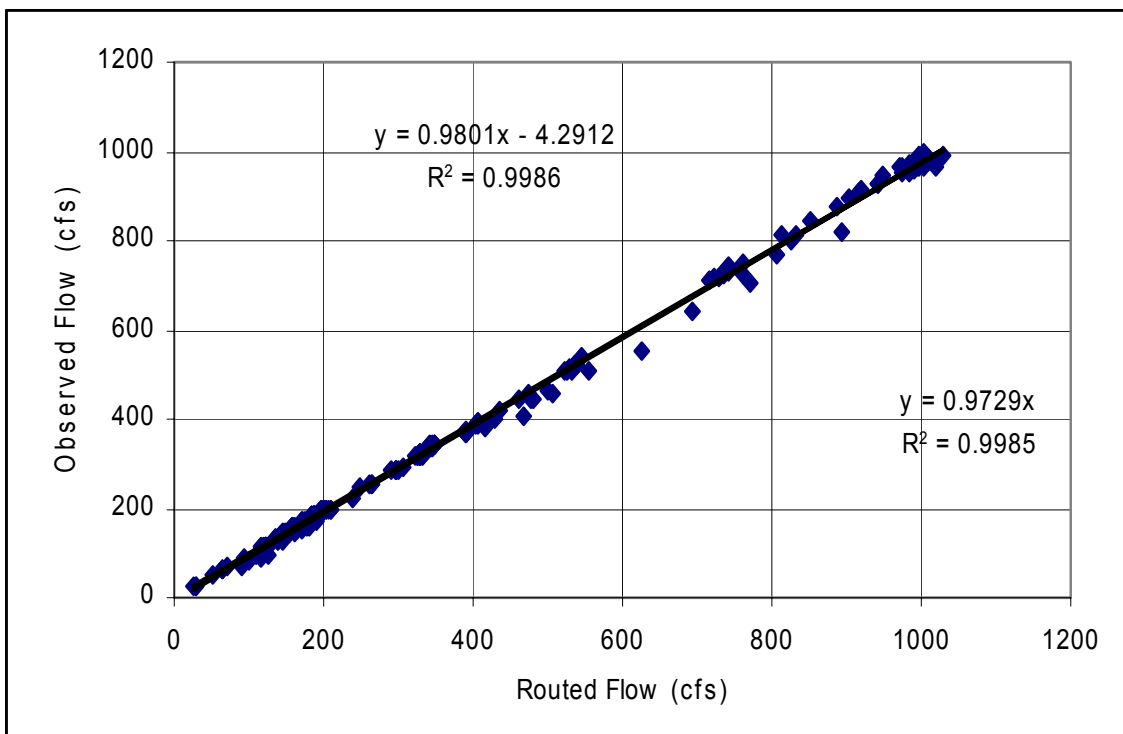
Graph 18. Observed flow versus routed flow, filtered for losses, Rio Chama below El Vado Dam to above Abiquiu Reservoir, August 1962-96.



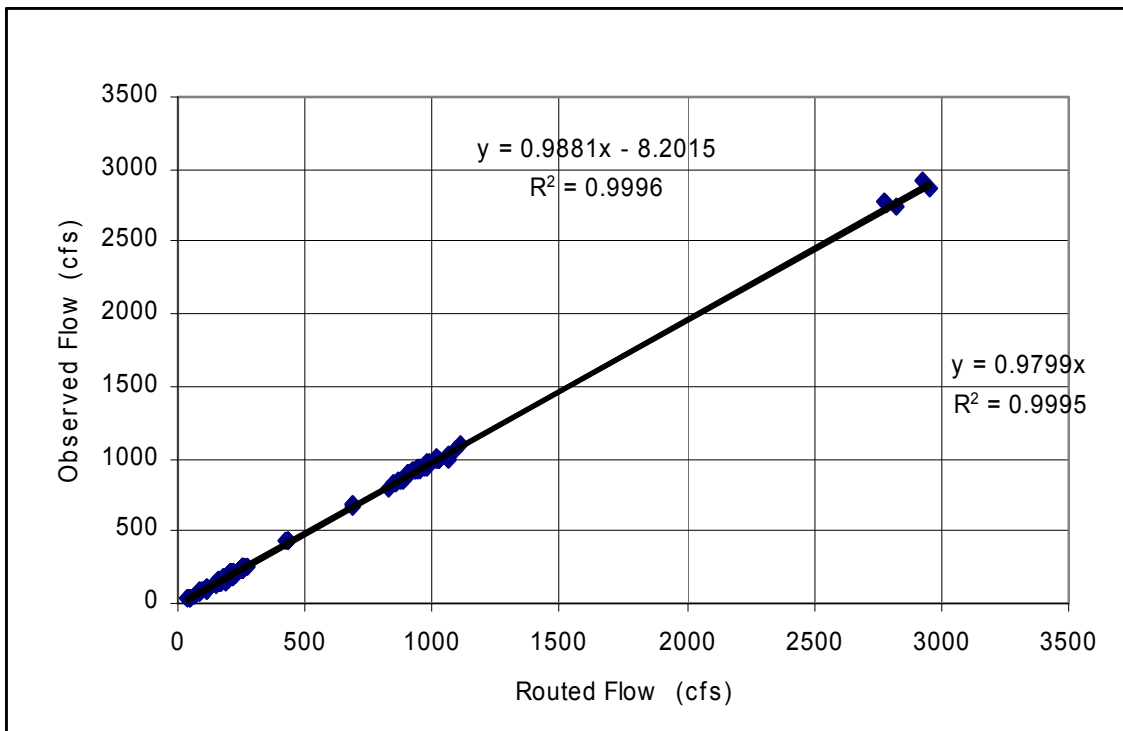
Graph 19. Observed flow versus routed flow, filtered for losses, Rio Chama below El Vado Dam to above Abiquiu Reservoir, September 1962-96.



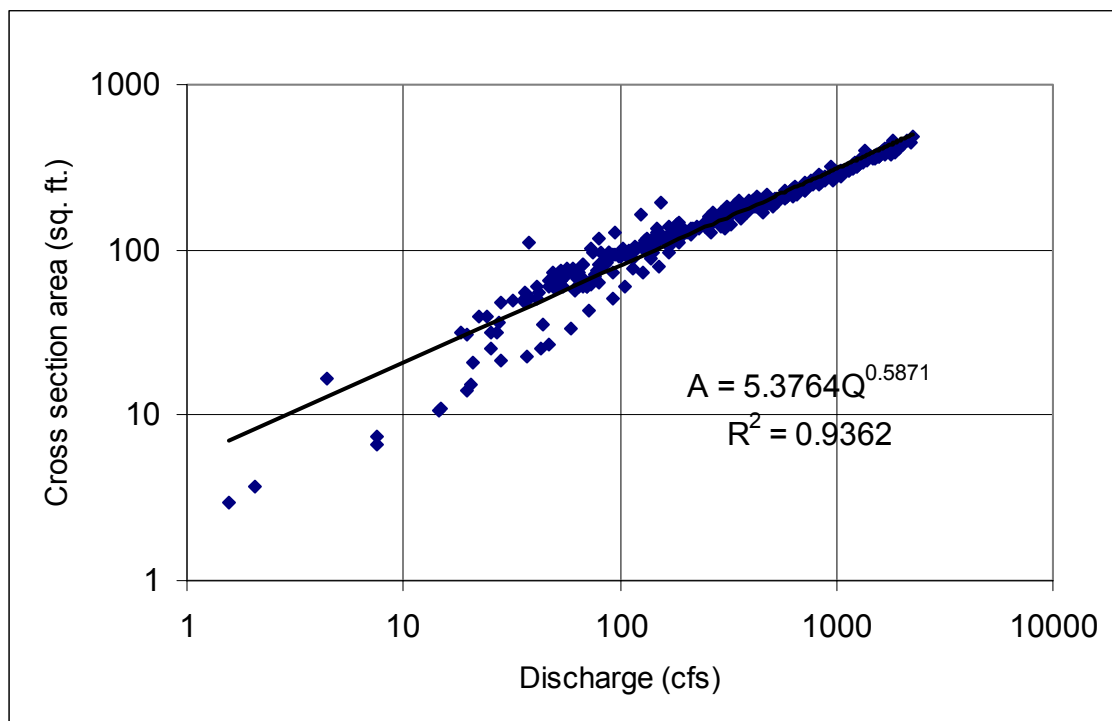
Graph 20. Observed flow versus routed flow, filtered for losses, Rio Chama below El Vado Dam to above Abiquiu Reservoir, October 1962-96.



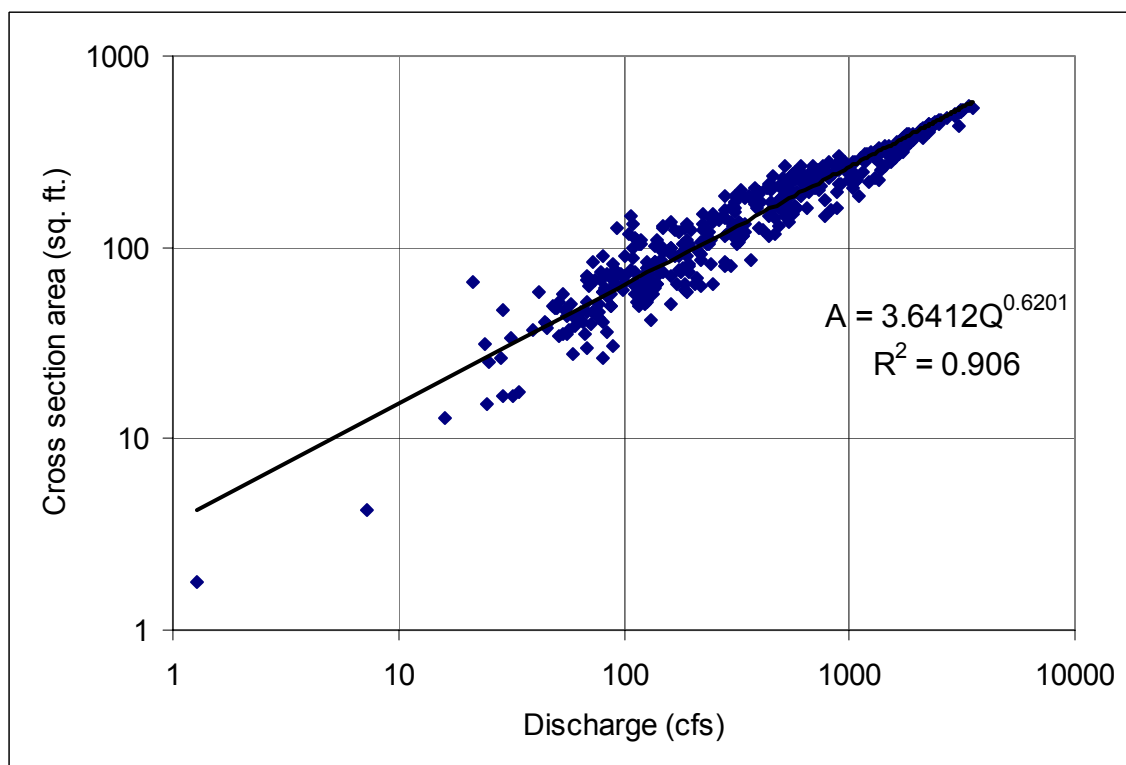
Graph 21. Observed flow versus routed flow, filtered for losses, Rio Chama below El Vado Dam to above Abiquiu Reservoir, November 1962-96.



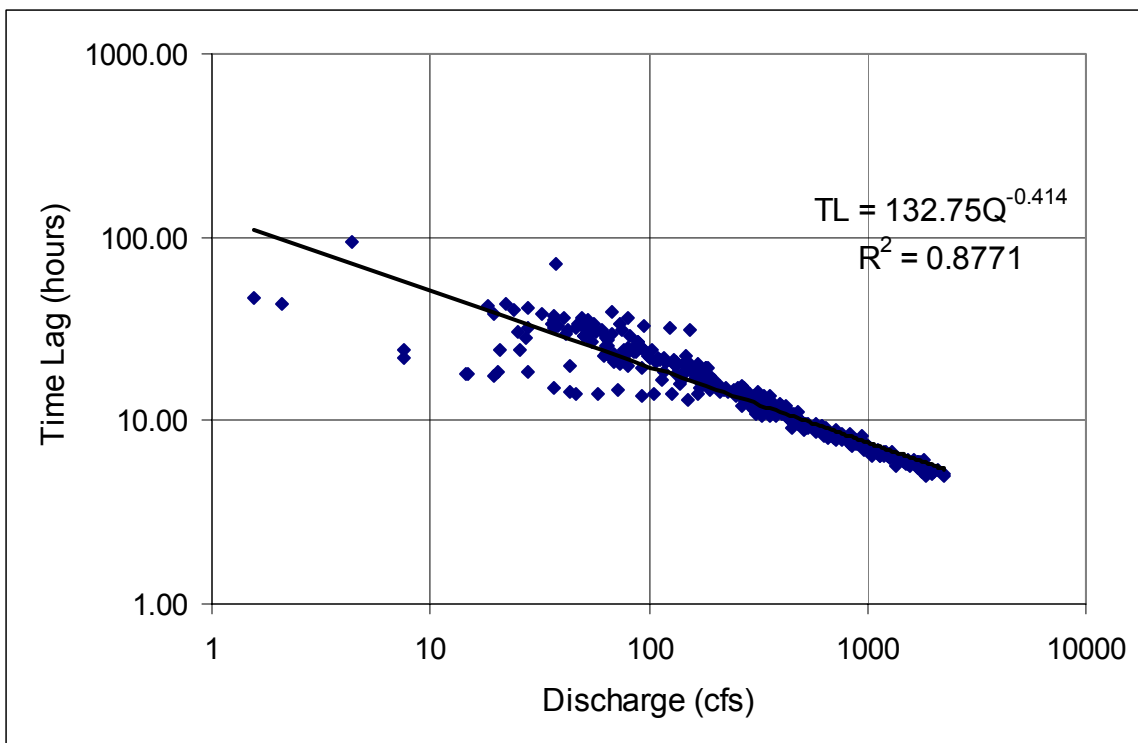
Graph 22. Observed flow versus routed flow, filtered for losses, Rio Chama below El Vado Dam to above Abiquiu Reservoir, December 1962-96.



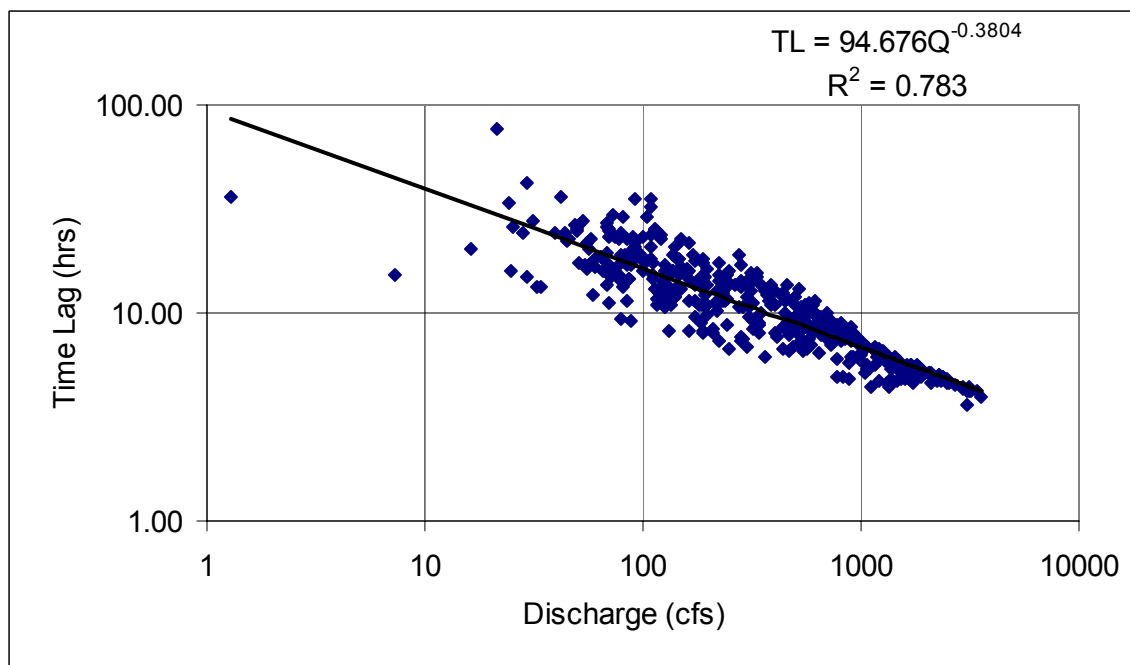
Graph 23. Cross section area versus discharge, Rio Chama below Abiquiu Dam.



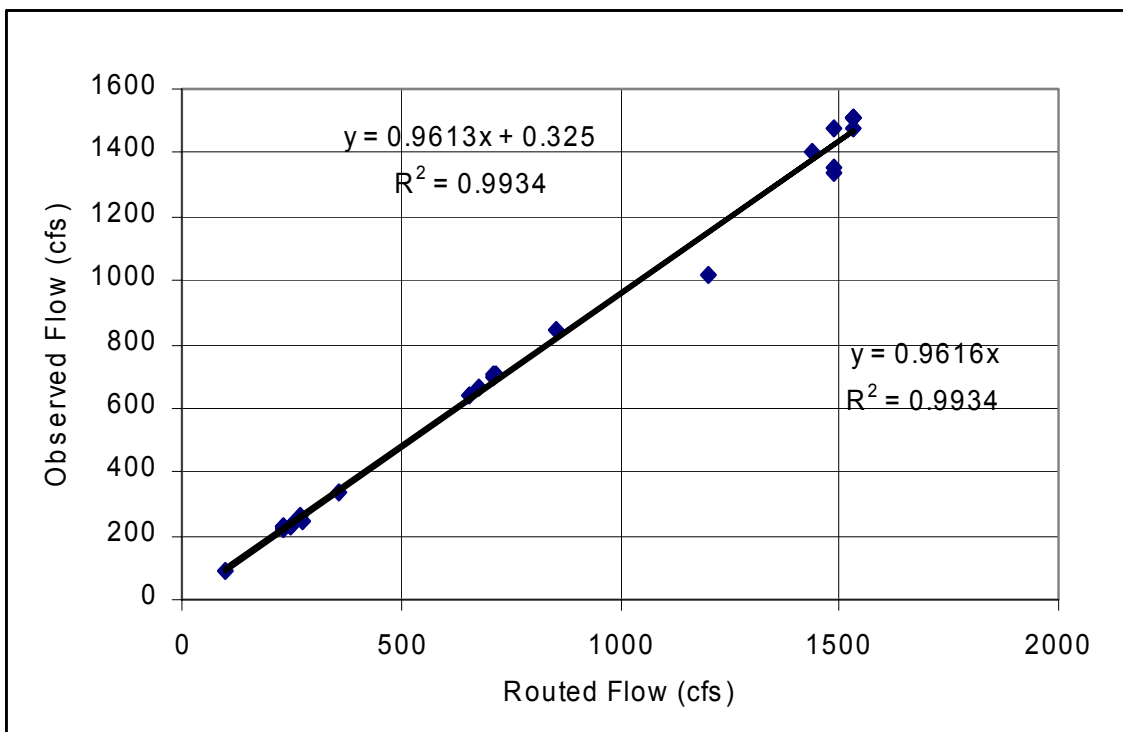
Graph 24. Cross section area versus discharge, Rio Chama near Chamita.



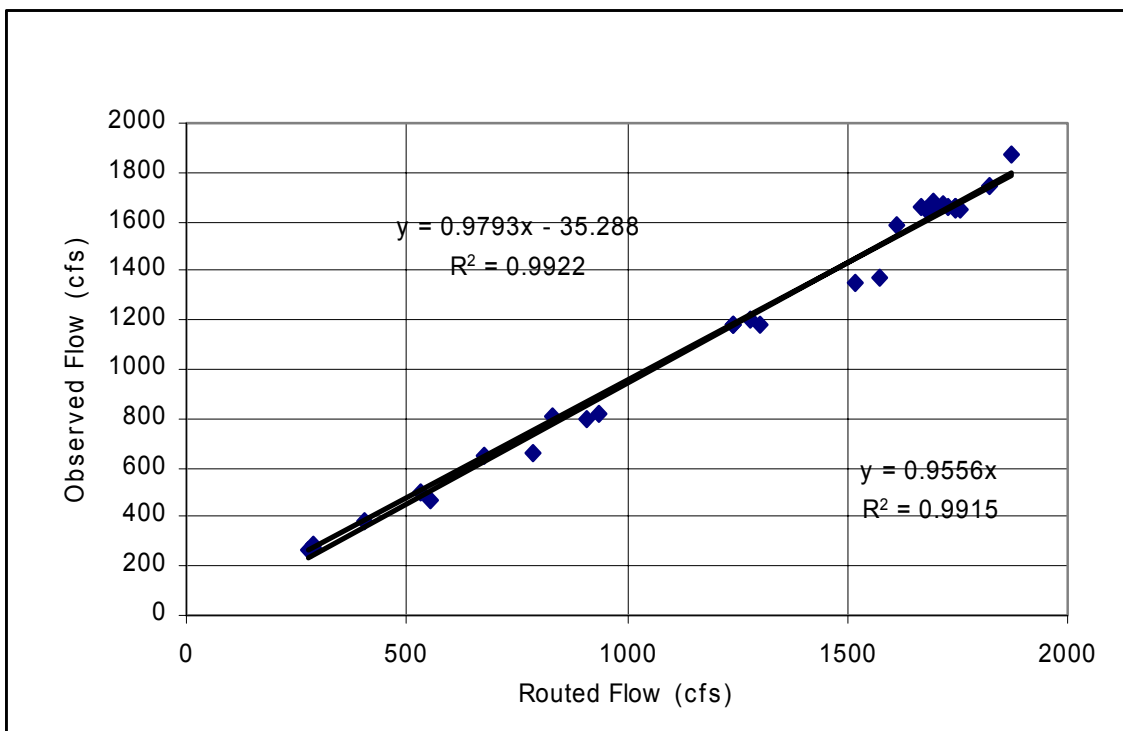
Graph 25. Travel time versus discharge, Rio Chama below Abiquiu Dam to near Chamita (based on gage below Abiquiu Dam).



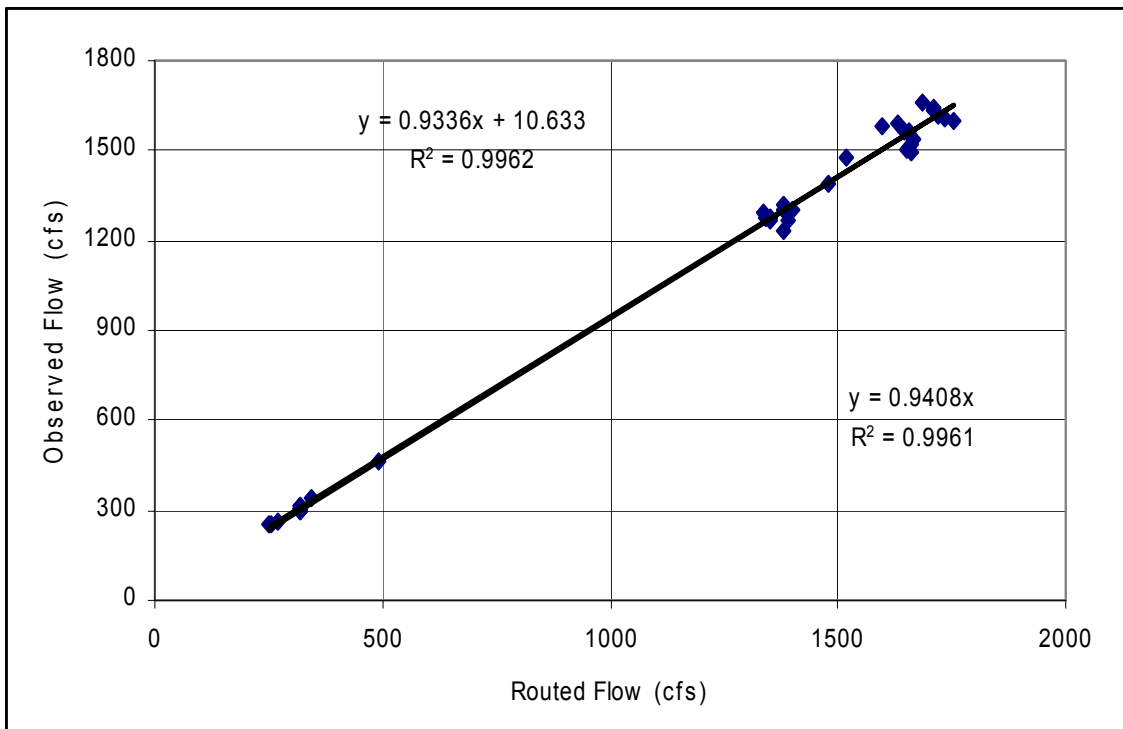
Graph 26. Travel time versus discharge, Rio Chama below Abiquiu Dam to near Chamita (based on gage near Chamita).



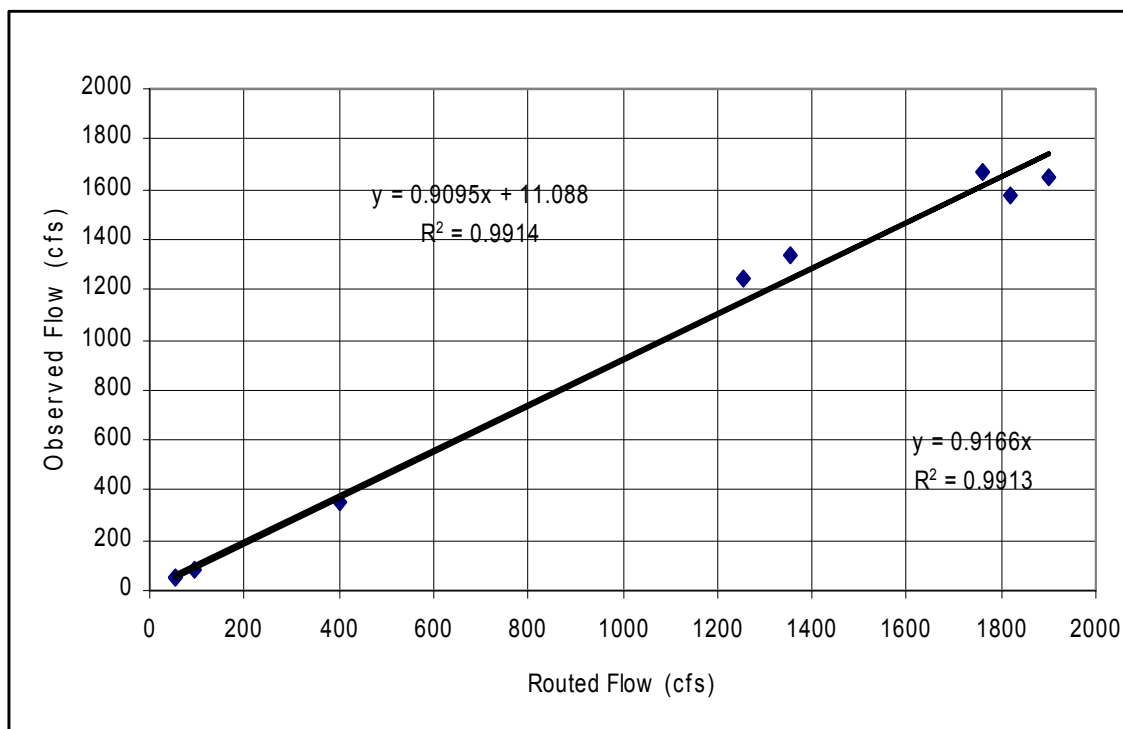
Graph 27. Observed flow versus routed flow, filtered for losses, Rio Chama below Abiquiu Dam to near Chamita, January 1973-96.



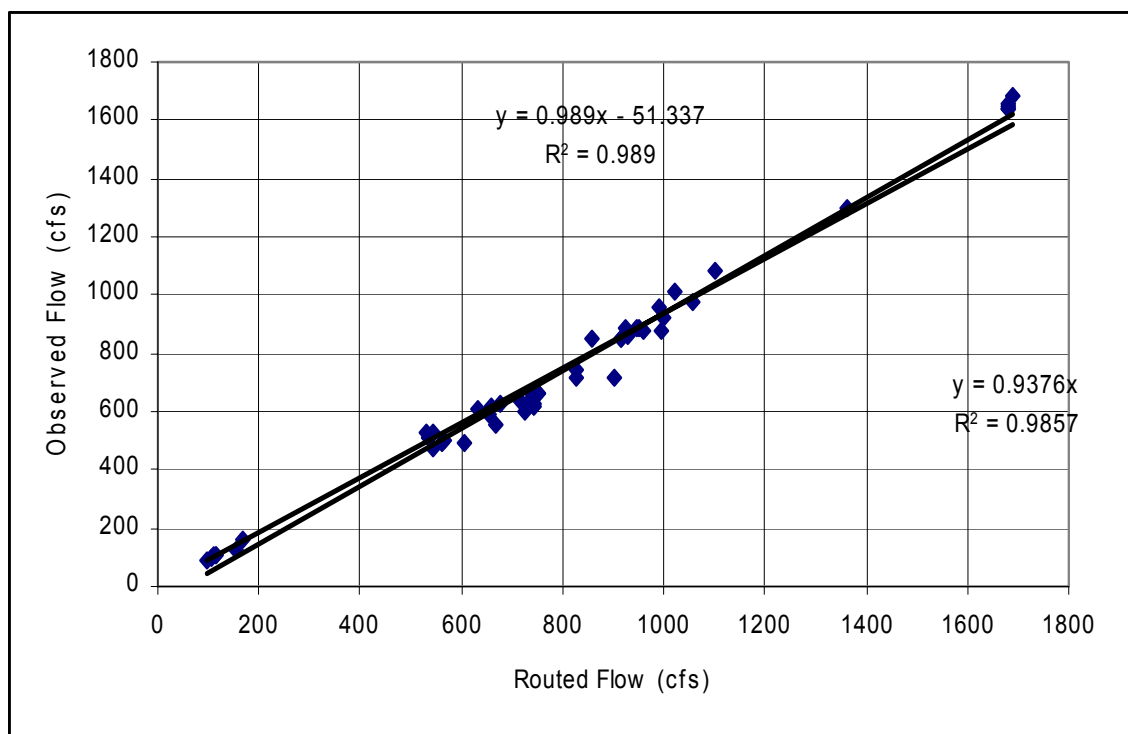
Graph 28. Observed flow versus routed flow, filtered for losses, Rio Chama below Abiquiu Dam to near Chamita, February 1973-96.



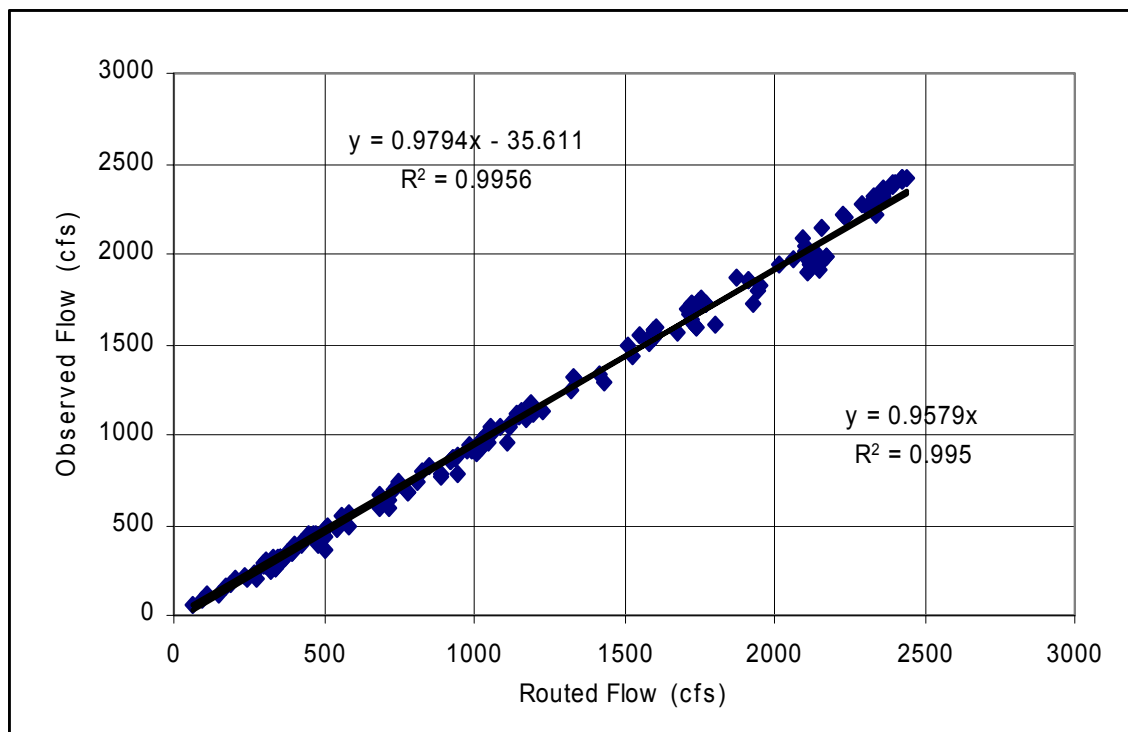
Graph 29. Observed flow versus routed flow, filtered for losses, Rio Chama below Abiquiu Dam to near Chamita, March 1973-96.



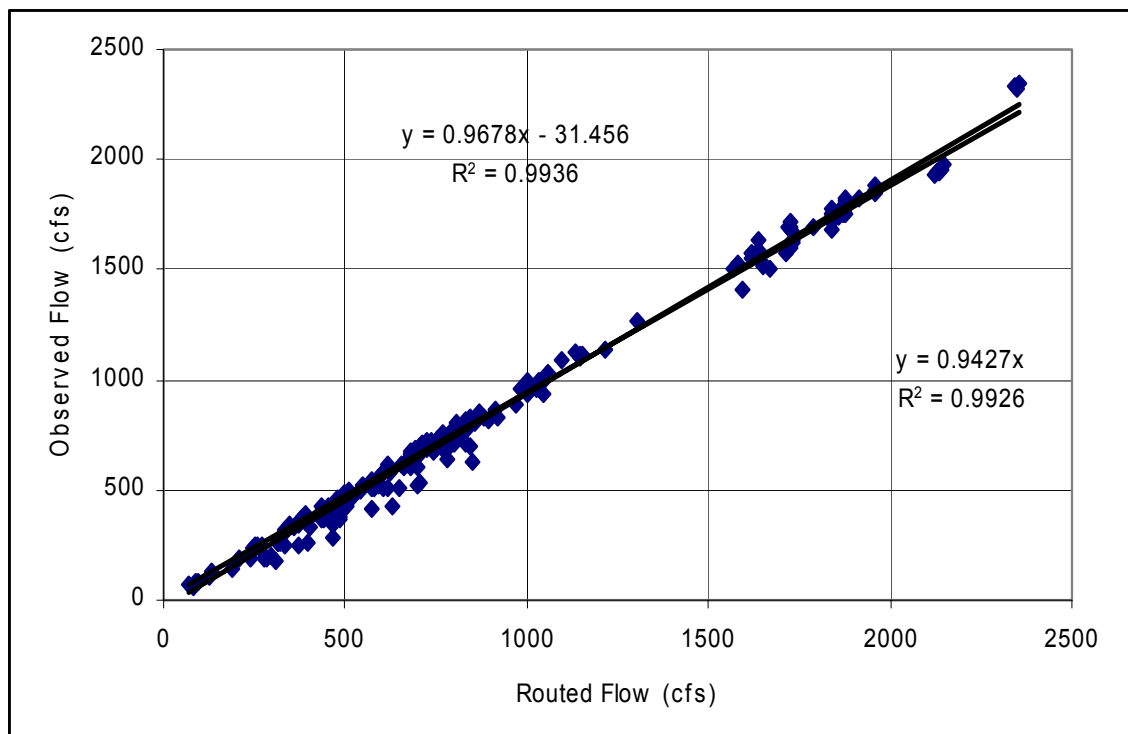
Graph 30. Observed flow versus routed flow, filtered for losses, Rio Chama below Abiquiu Dam to near Chamita, April 1973-96.



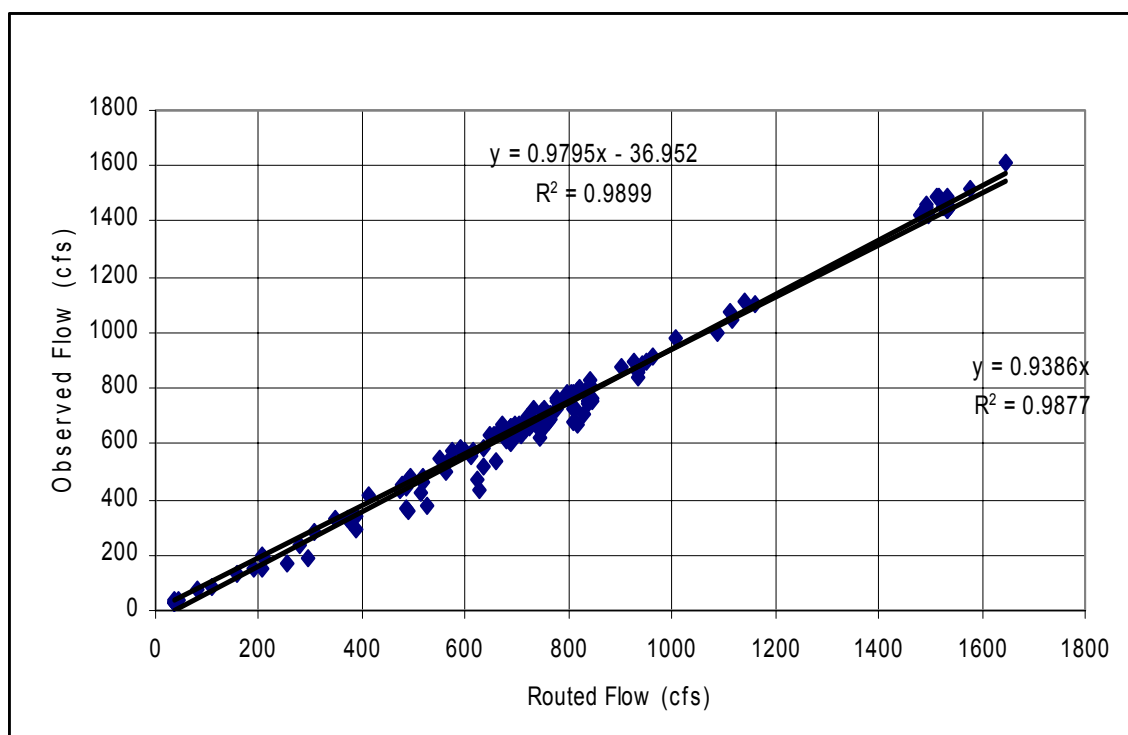
Graph 31. Observed flow versus routed flow, filtered for losses, Rio Chama below Abiquiu Dam to near Chamita, May 1973-96.



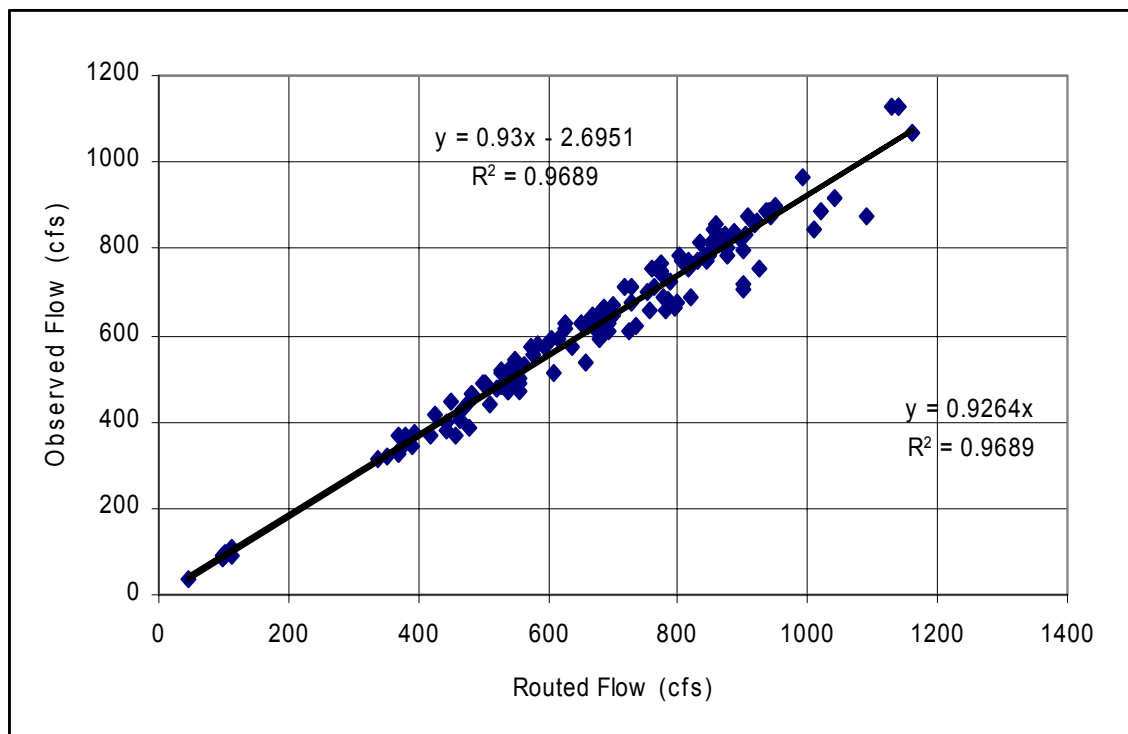
Graph 32. Observed flow versus routed flow, filtered for losses, Rio Chama below Abiquiu Dam to near Chamita, June 1973-96.



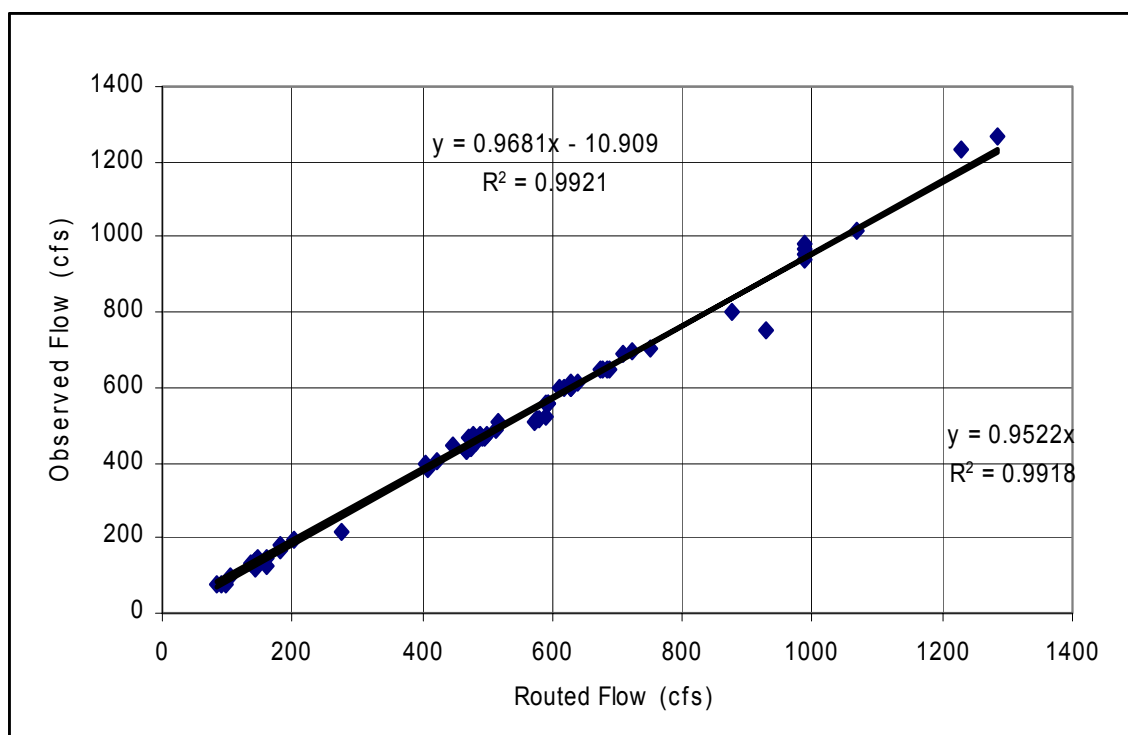
Graph 33. Observed flow versus routed flow, filtered for losses, Rio Chama below Abiquiu Dam to near Chamita, July 1973-96.



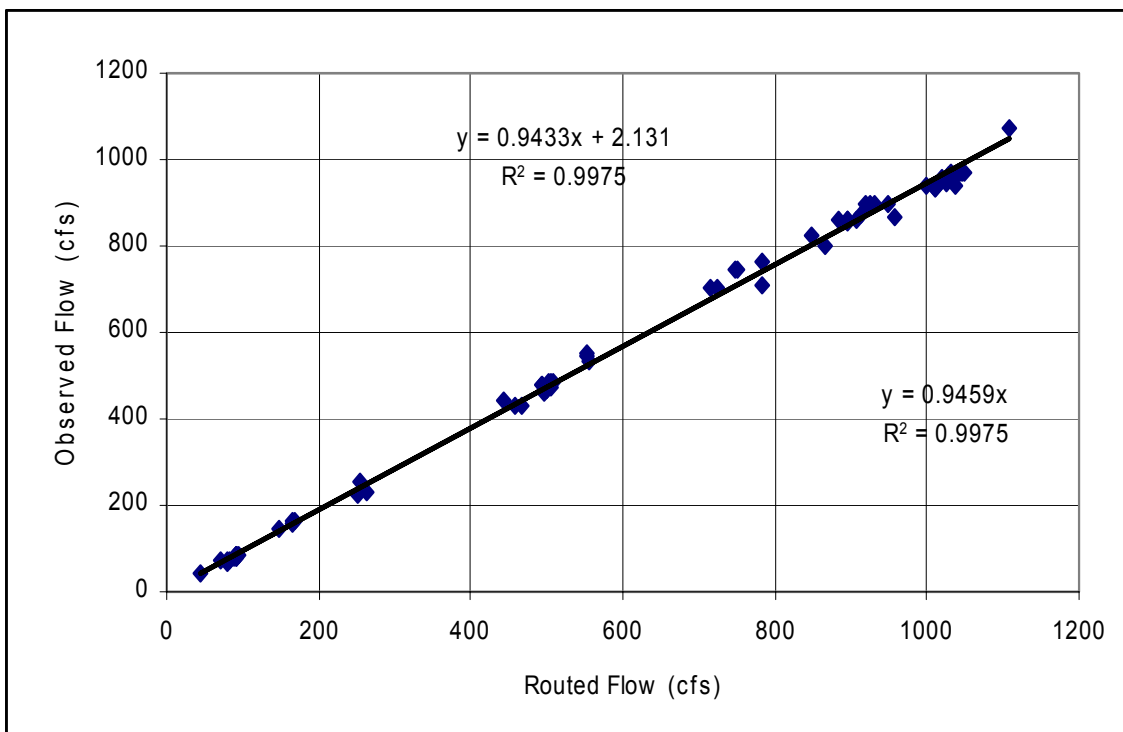
Graph 34. Observed flow versus routed flow, filtered for losses, Rio Chama below Abiquiu Dam to near Chamita, August 1973-96.



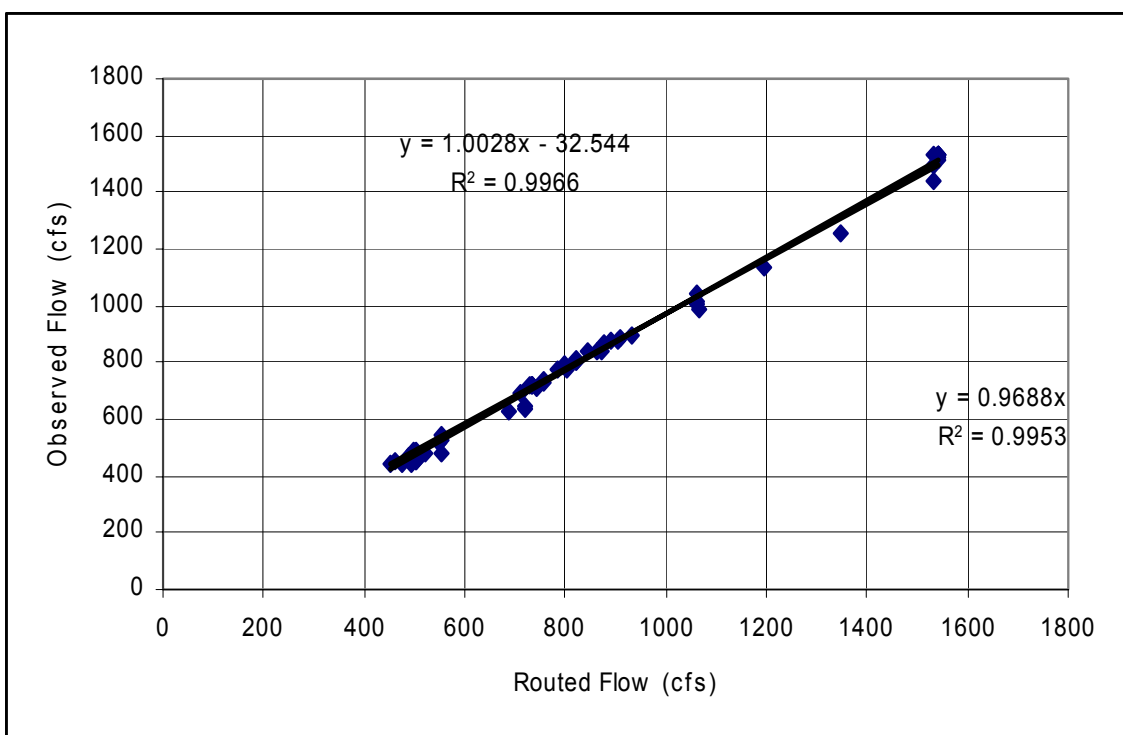
Graph 35. Observed flow versus routed flow, filtered for losses, Rio Chama below Abiquiu Dam to near Chamita, September 1973-96.



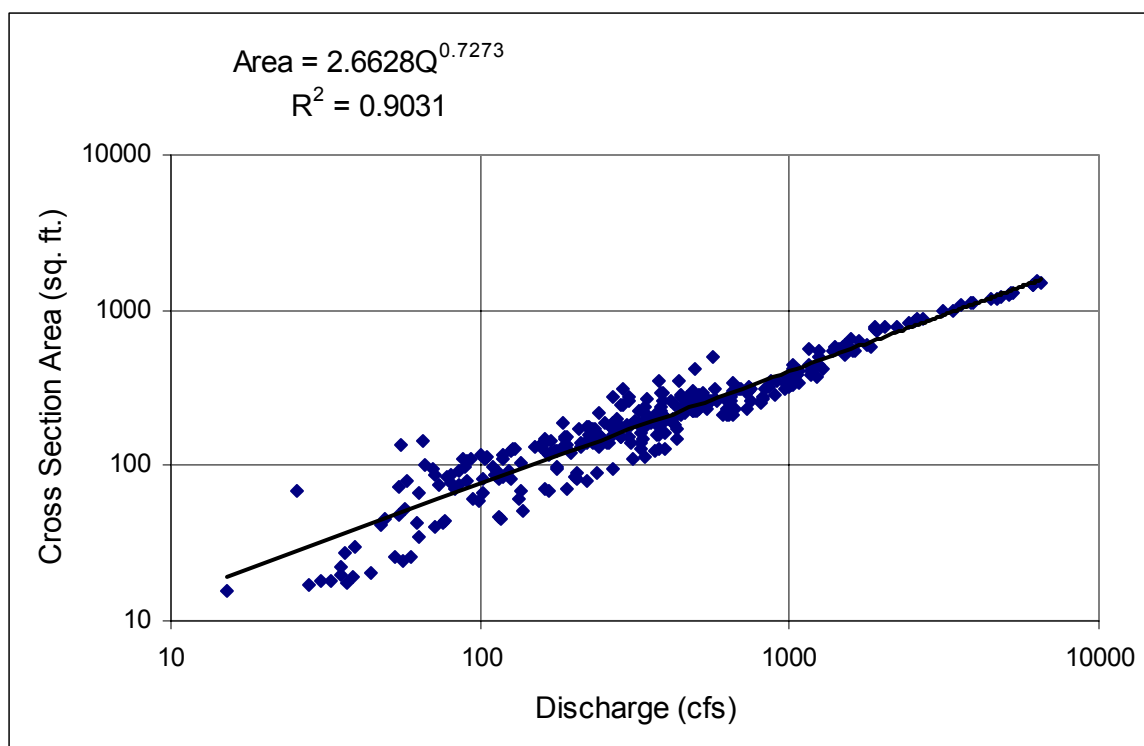
Graph 36. Observed flow versus routed flow, filtered for losses, Rio Chama below Abiquiu Dam to near Chamita, October 1973-96.



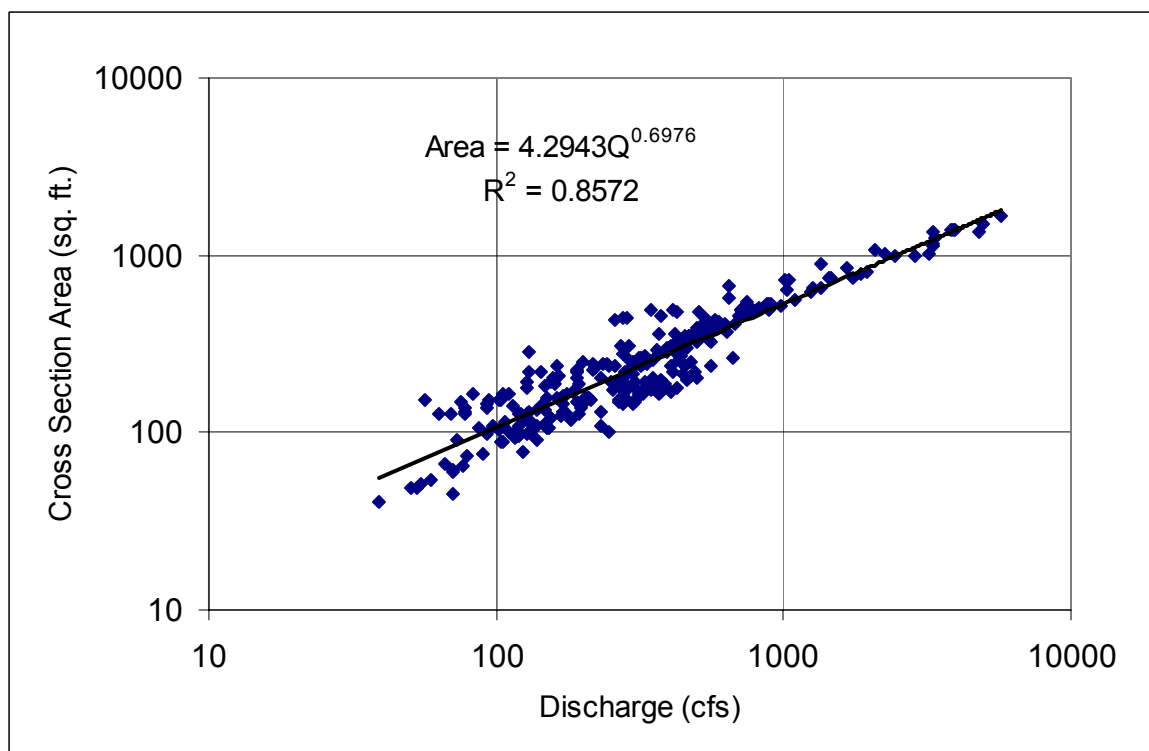
Graph 37. Observed flow versus routed flow, filtered for losses, Rio Chama below Abiquiu Dam to near Chamita, November 1973-96.



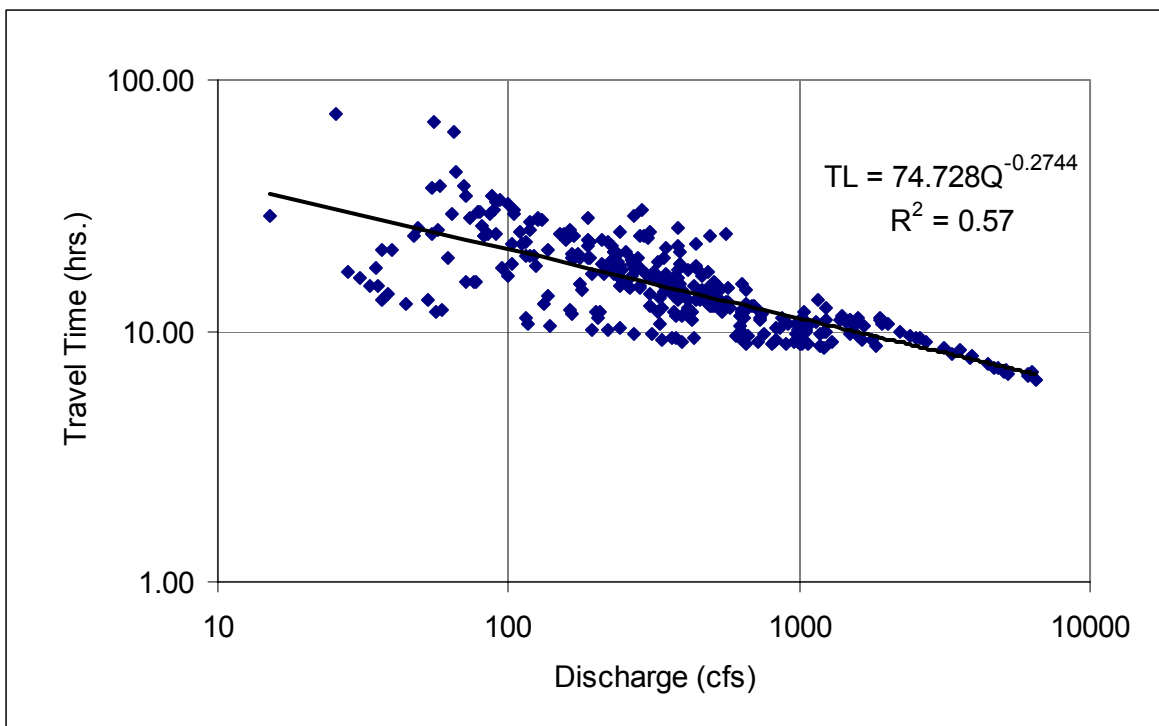
Graph 38. Observed flow versus routed flow, filtered for losses, Rio Chama below Abiquiu Dam to near Chamita, December 1973-96.



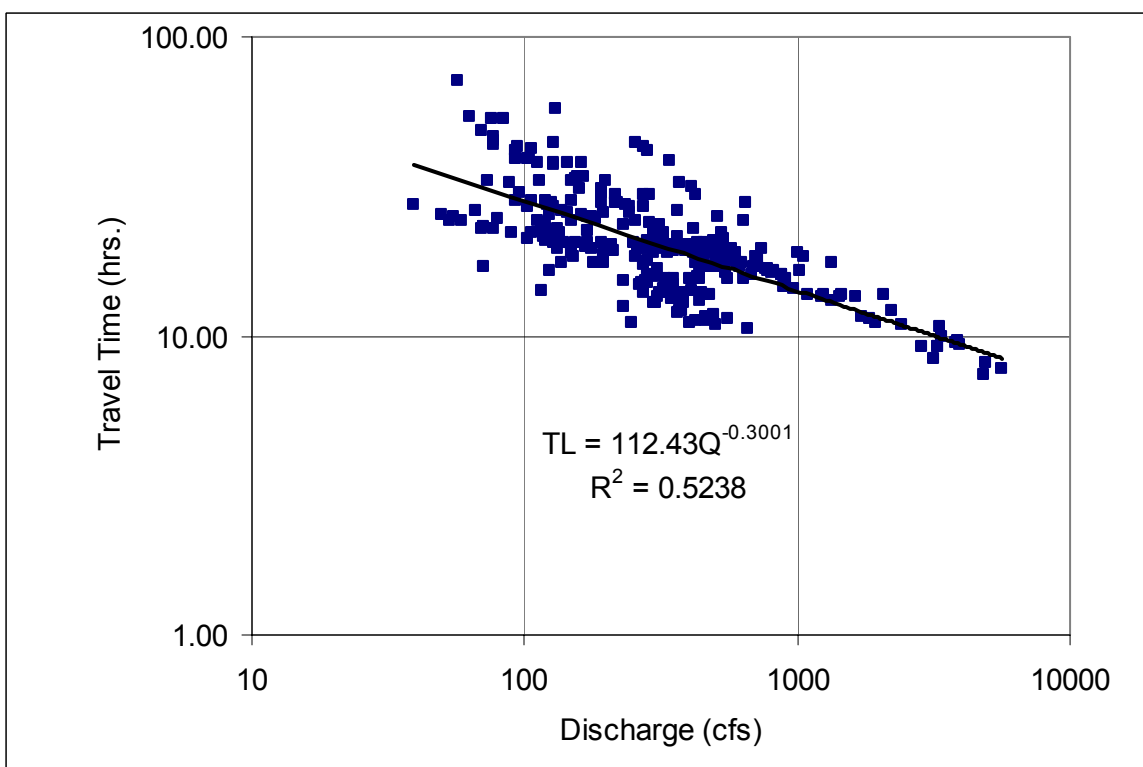
Graph 39. Cross section area versus discharge, Rio Grande near Lobatos, Colorado.



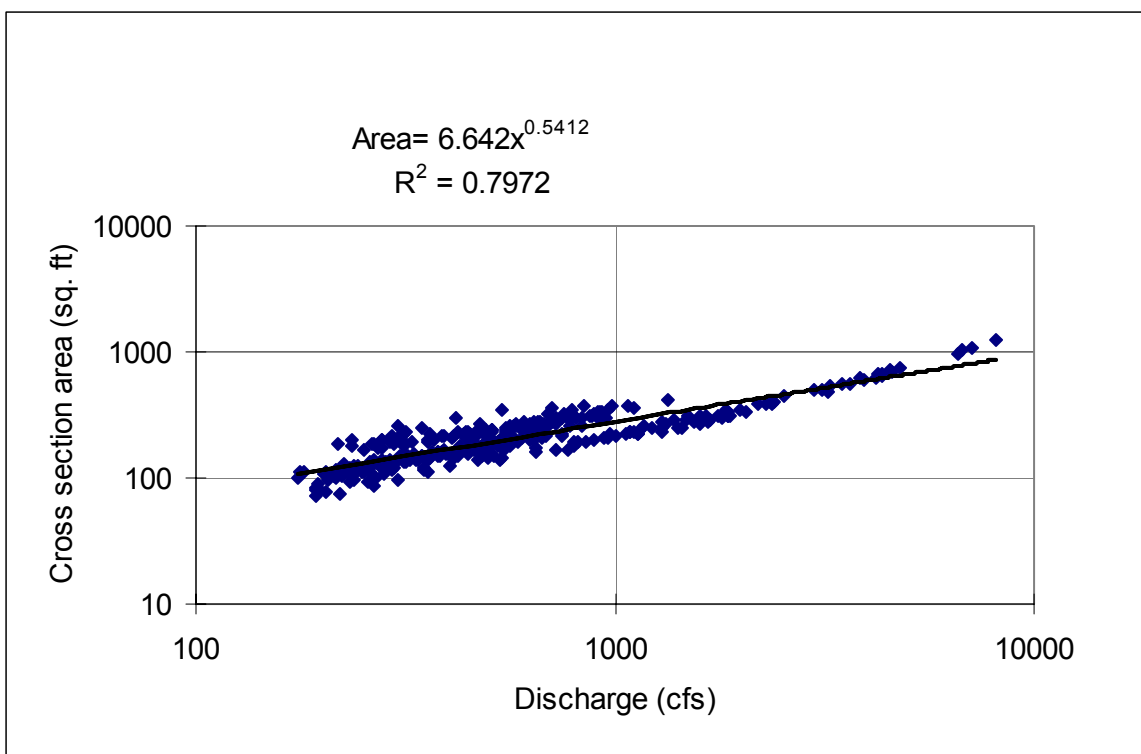
Graph 40. Cross section area versus discharge, Rio Grande near Cerro, NM.



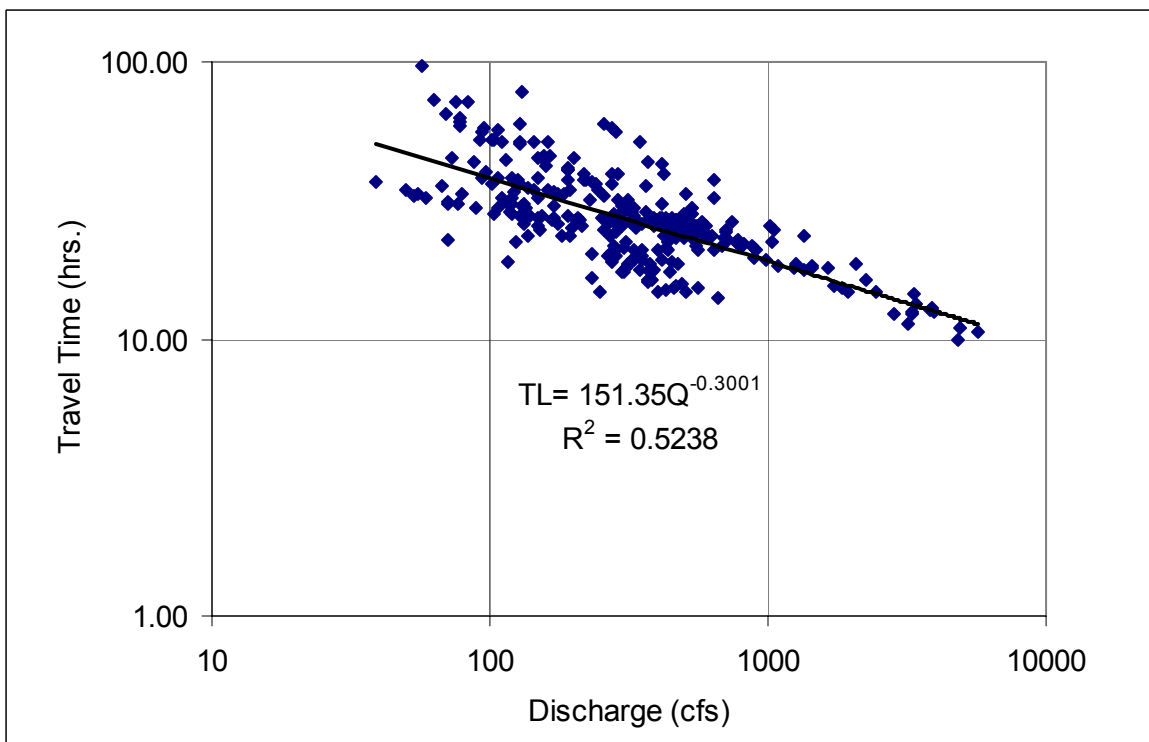
Graph 41. Travel time versus discharge, Rio Grande near Lobatos, Colorado to near Cerro, New Mexico (based on gage near Lobatos).



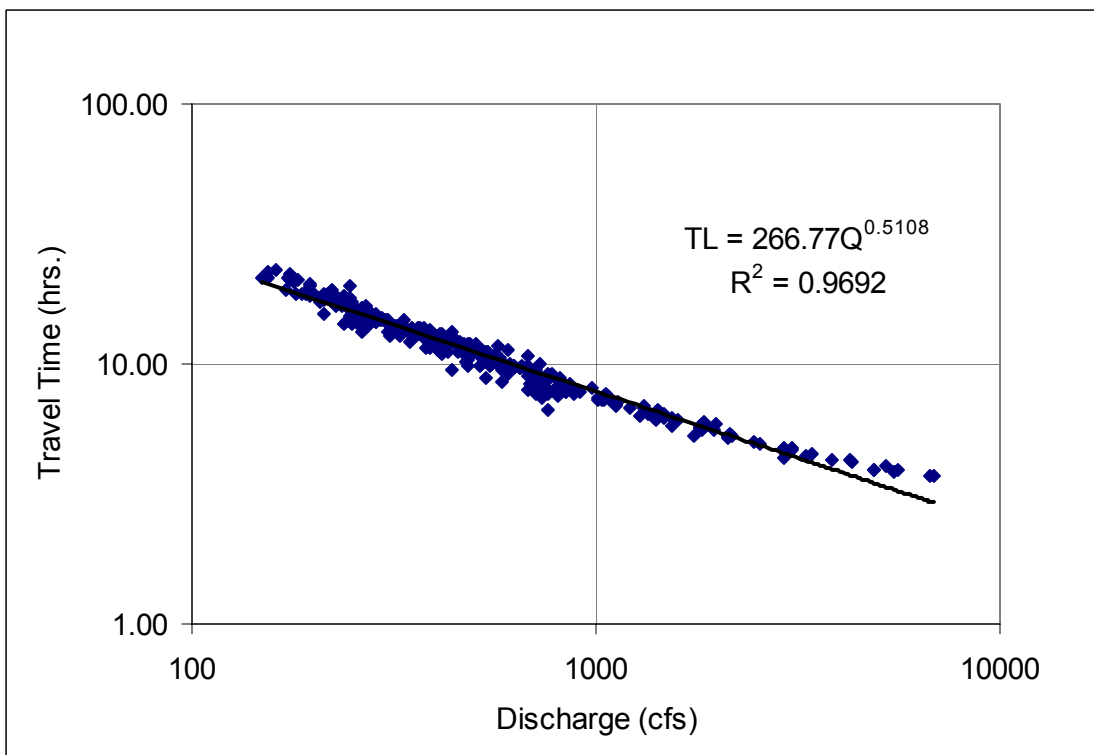
Graph 42. Travel time versus discharge, Rio Grande near Lobatos, Colorado to near Cerro, New Mexico (based on gage near Cerro).



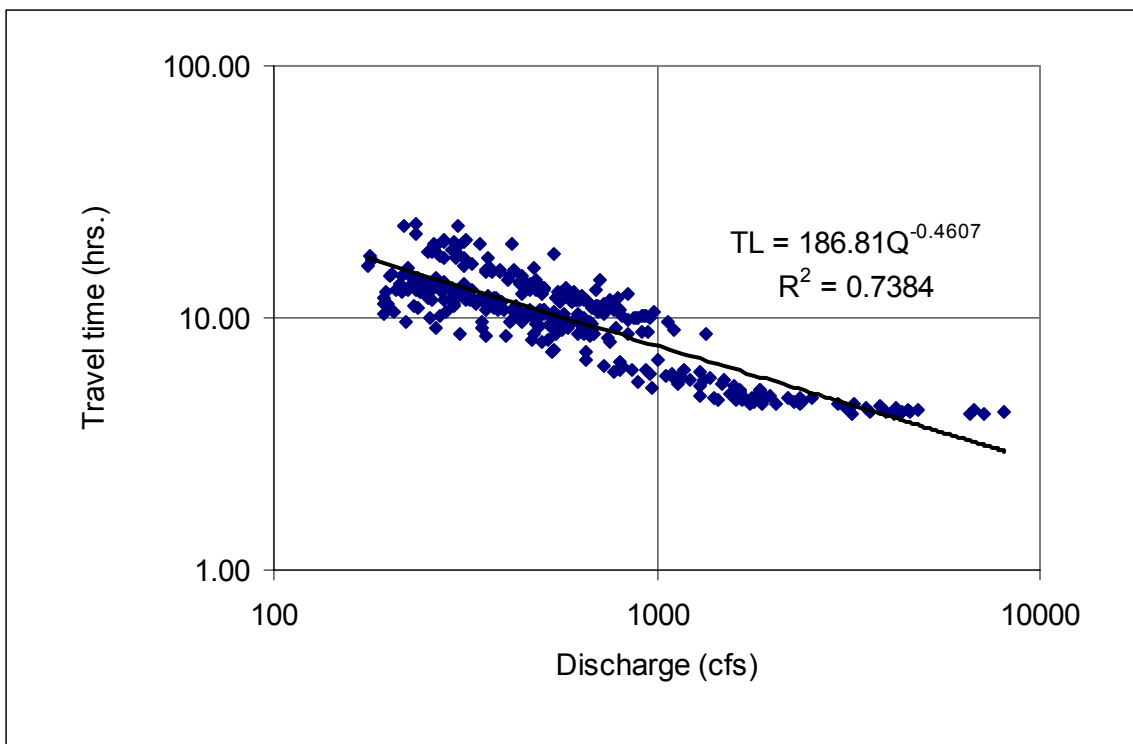
Graph 43. Cross section area versus discharge, Rio Grande below Taos Junction Bridge, near Taos.



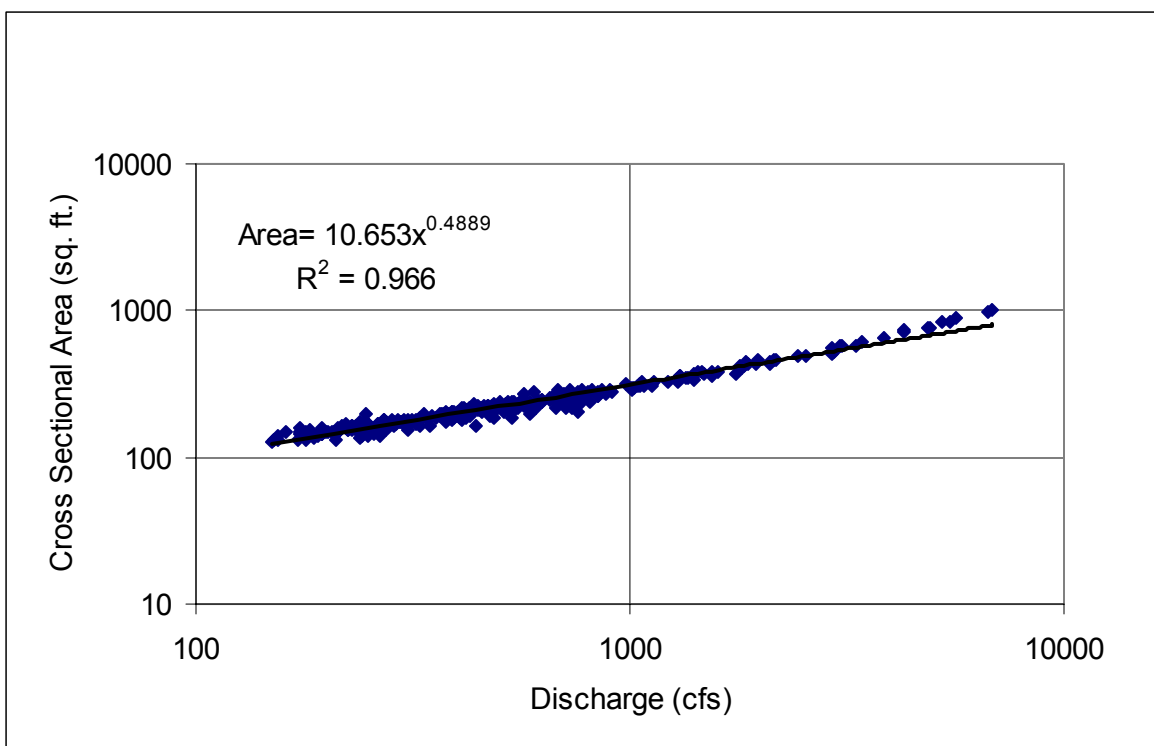
Graph 44. Travel time versus discharge, Rio Grande near Cerro to below Taos Junction Bridge, near Taos (based on gage near Cerro).



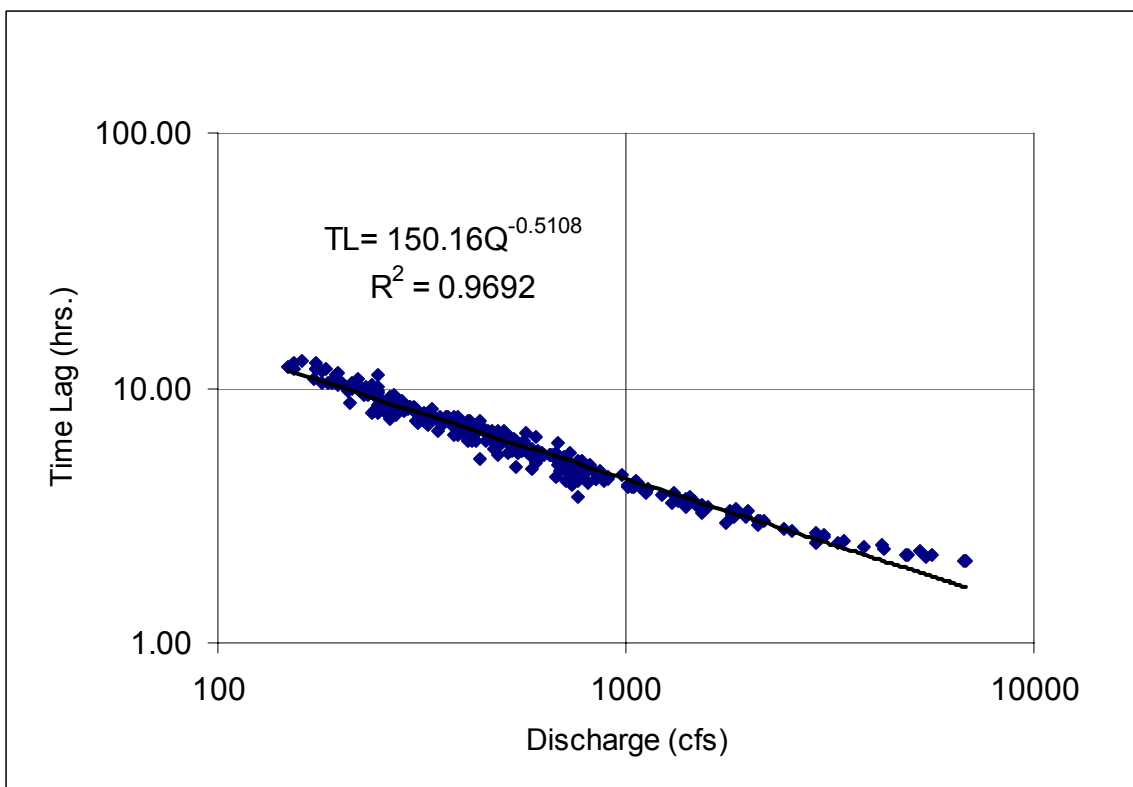
Graph 45. Travel time versus discharge, Rio Grande near Cerro to below Taos Junction Bridge, near Taos (based on gage near Arroyo Hondo).



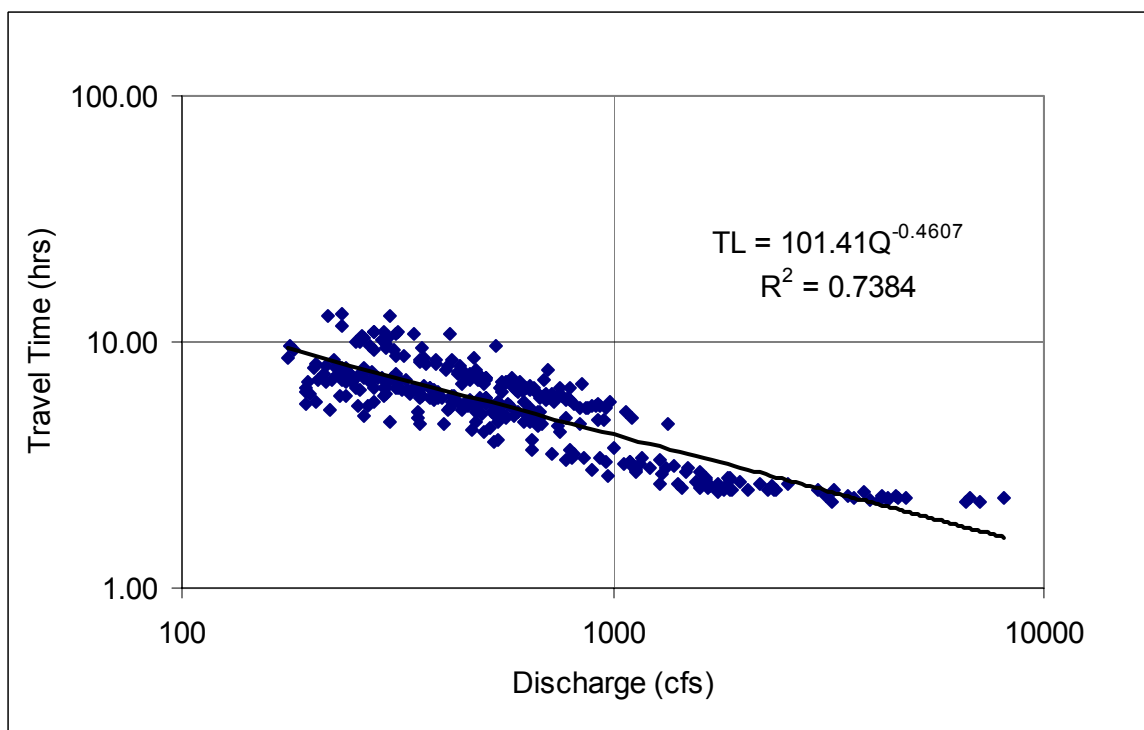
Graph 46. Travel time versus discharge, Rio Grande near Cerro to below Taos Junction Bridge, near Taos (based on gage below Taos Junction Bridge, near Taos).



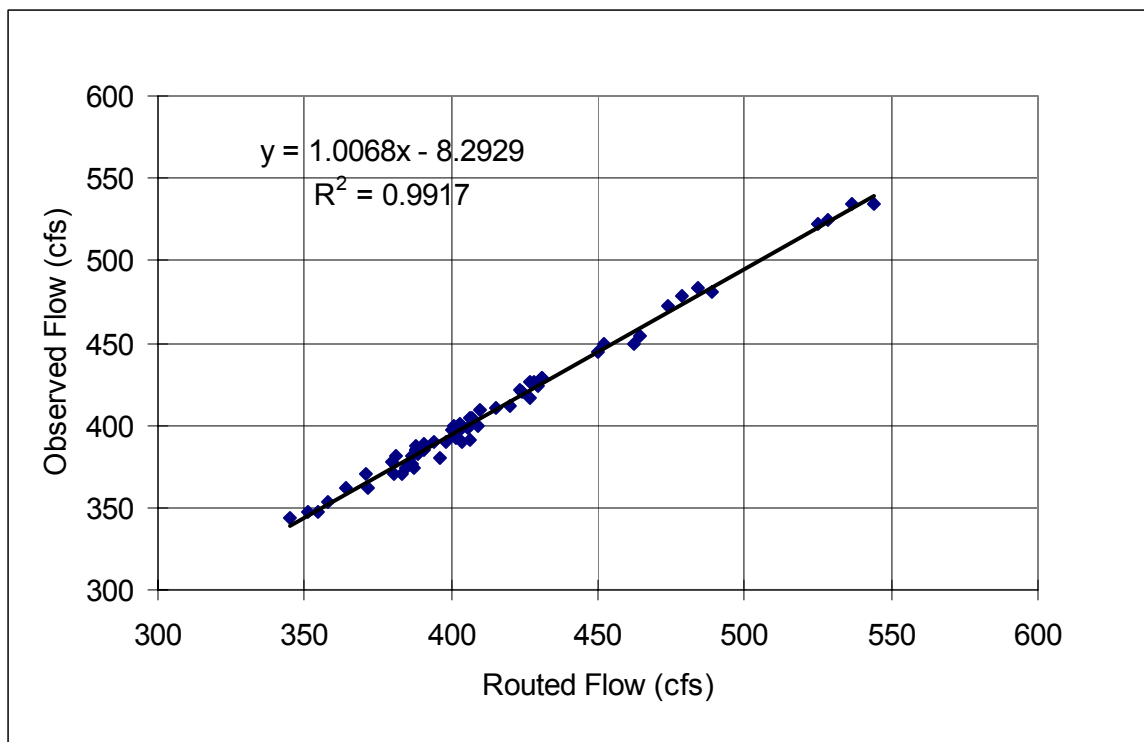
Graph 47. Cross section area versus discharge, Rio Grande near Arroyo Hondo.



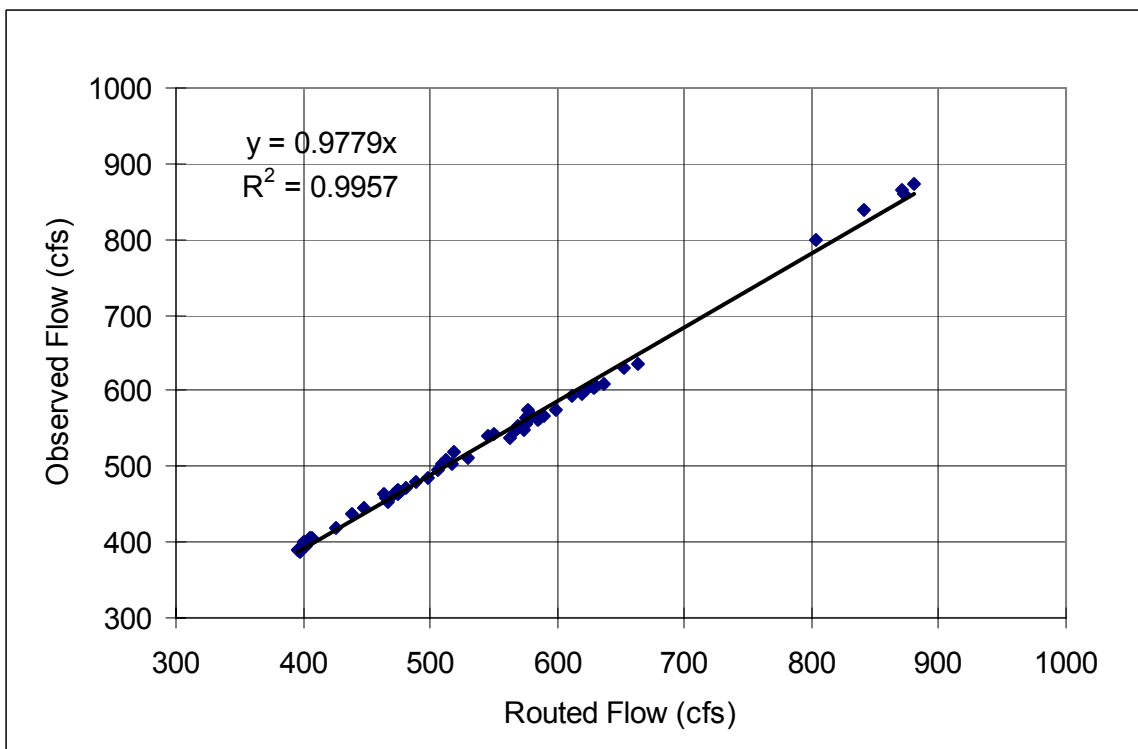
Graph 48. Travel time versus discharge, Rio Grande near Arroyo Hondo to below Taos Junction Bridge, near Taos (based on gage near Arroyo Hondo).



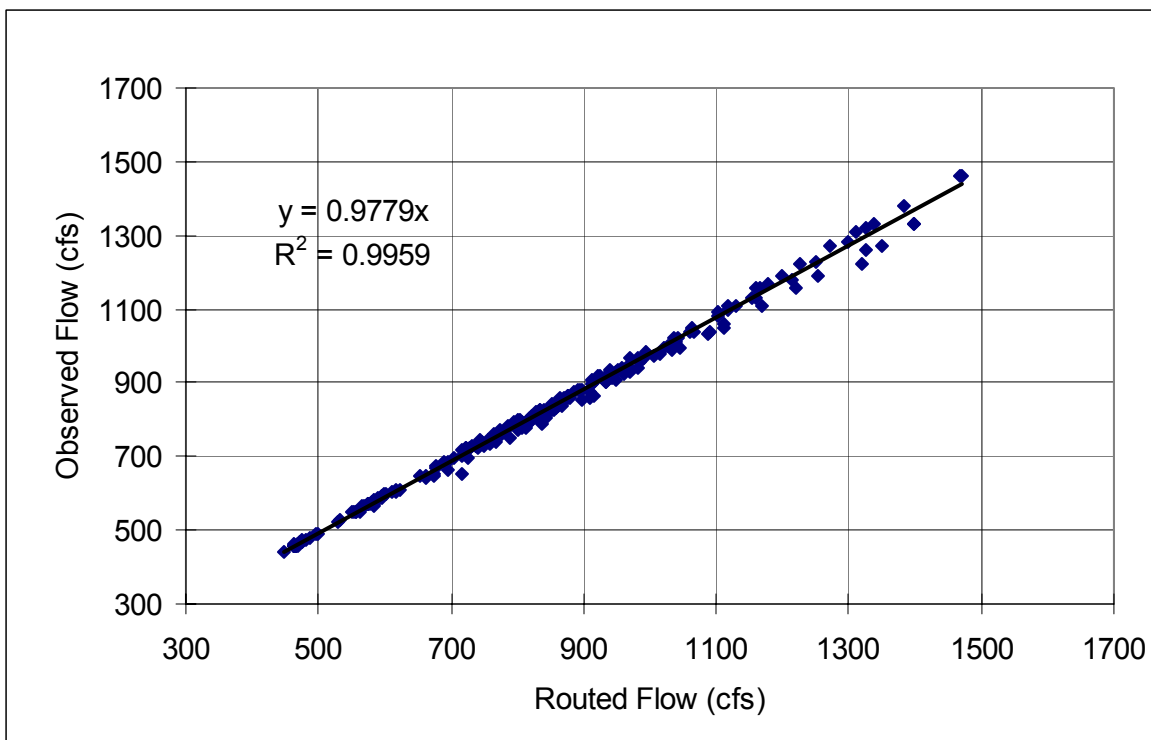
Graph 49. Travel time versus discharge, Rio Grande near Arroyo Hondo to below Taos Junction Bridge, near Taos (based on gage below Taos Junction Bridge, near Taos).



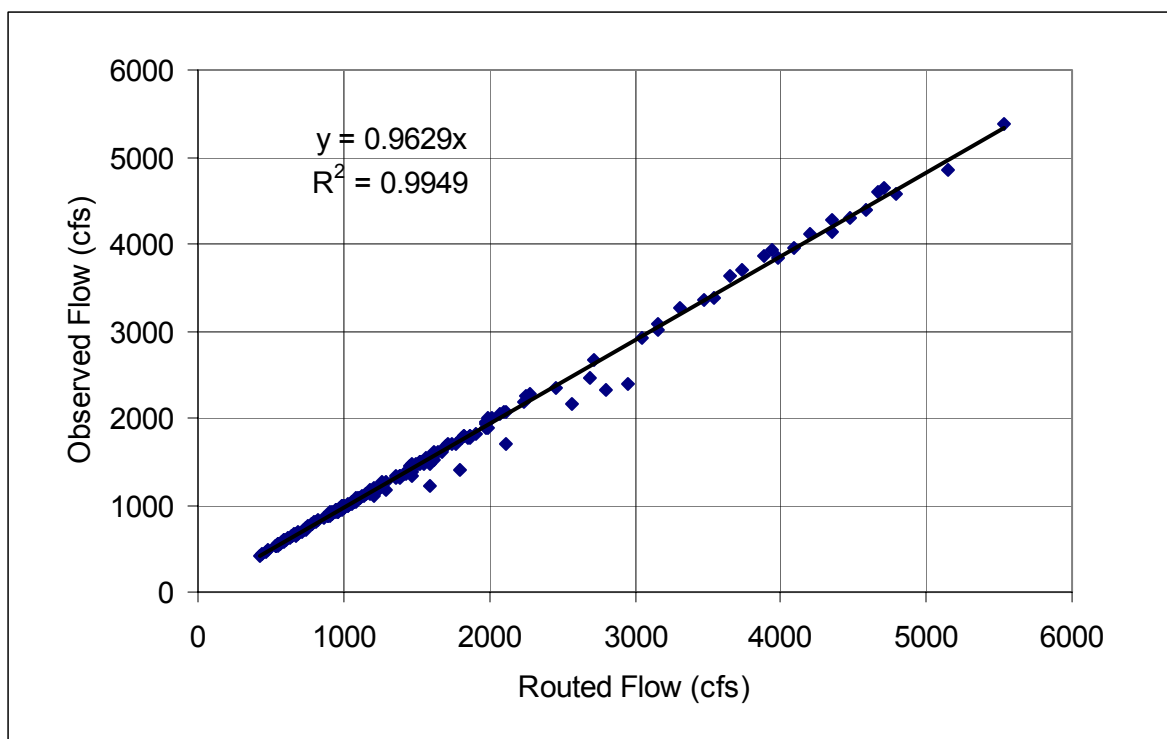
Graph 50. Observed flow versus routed flow, filtered for losses, Rio Grande near Arroyo Hondo to below Taos Junction Bridge, near Taos, January 1965-94.



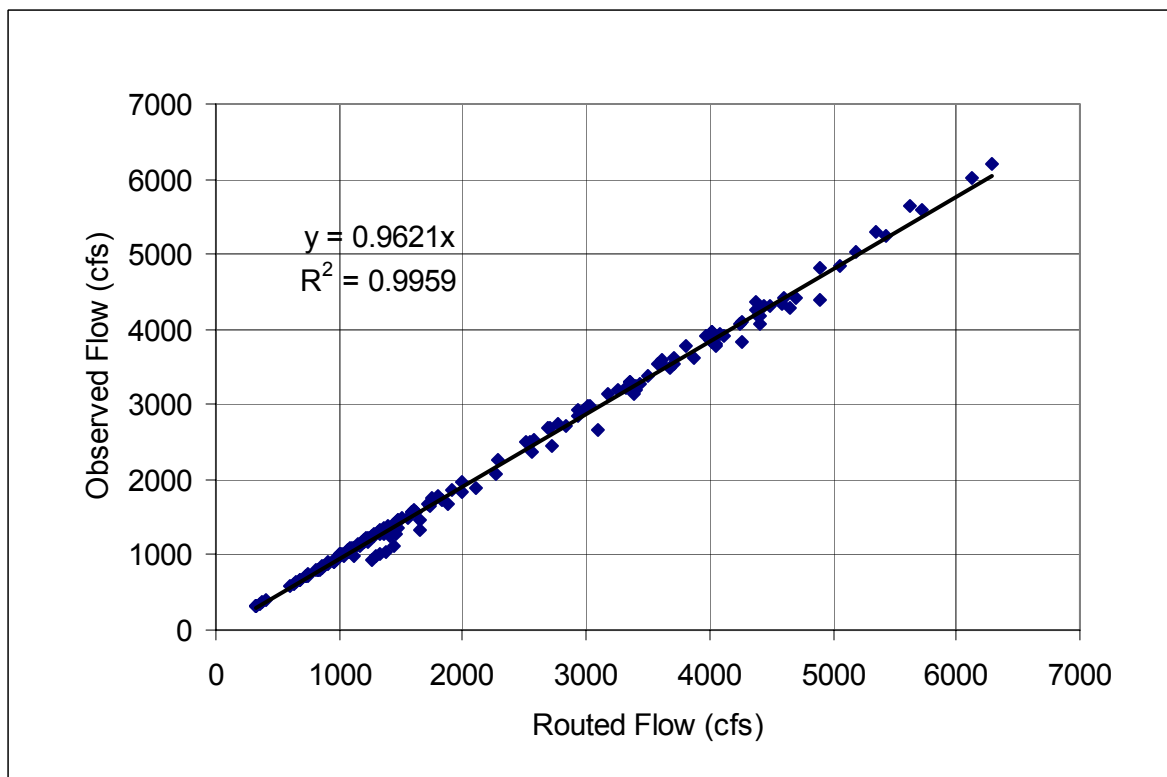
Graph 51. Observed flow versus routed flow, filtered for losses, near Arroyo Hondo to below Taos Junction Bridge, near Taos, February 1965-94.



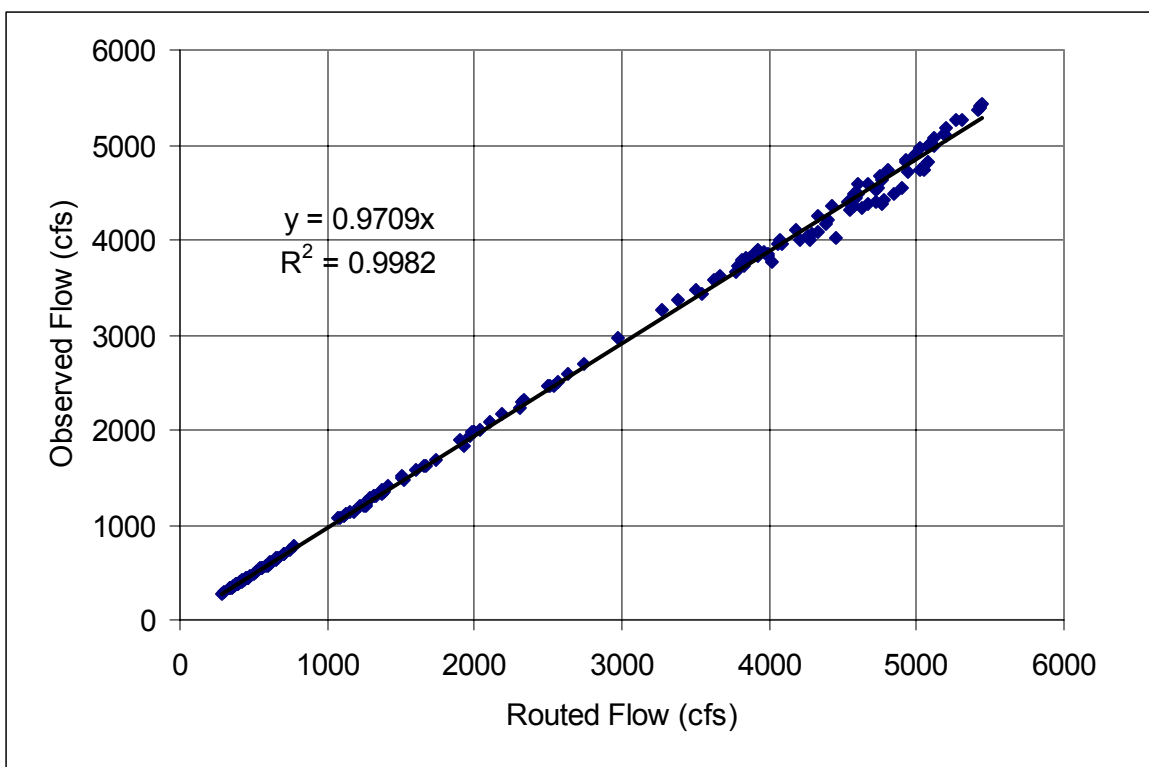
Graph 52. Observed flow versus routed flow, filtered for losses, near Arroyo Hondo to below Taos Junction Bridge, near Taos, March 1965-94.



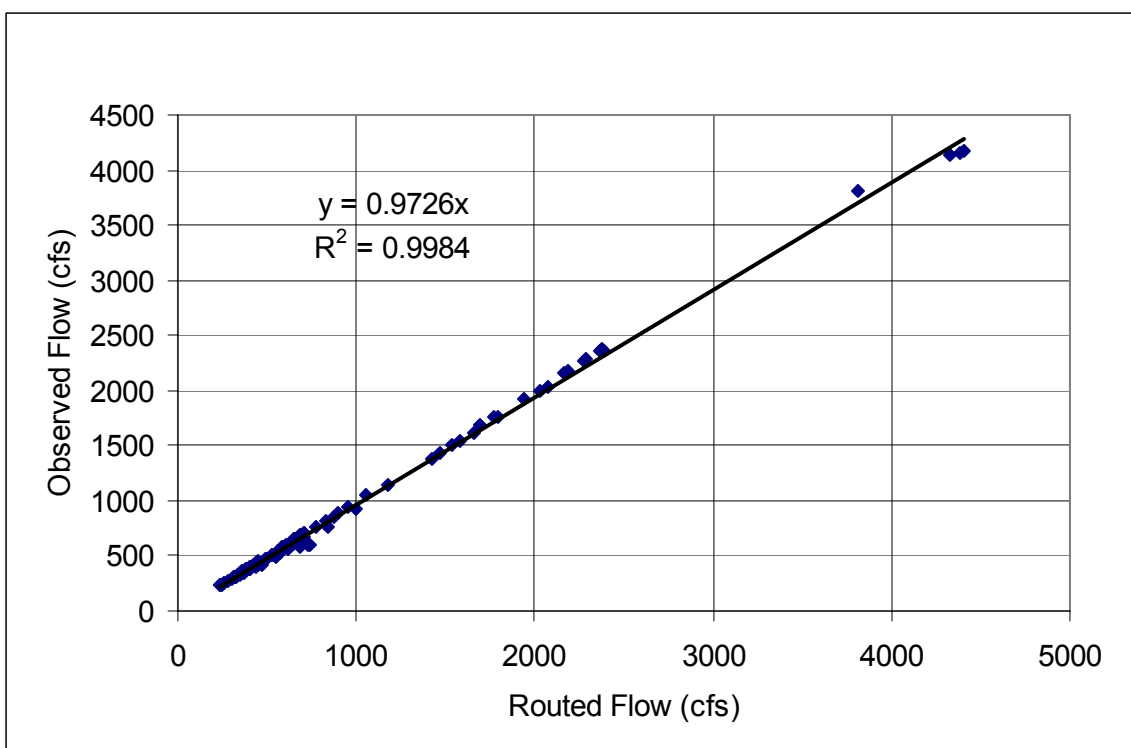
Graph 53. Observed flow versus routed flow, filtered for losses, Rio Grande near Arroyo Hondo to below Taos Junction Bridge, near Taos, April 1965-94.



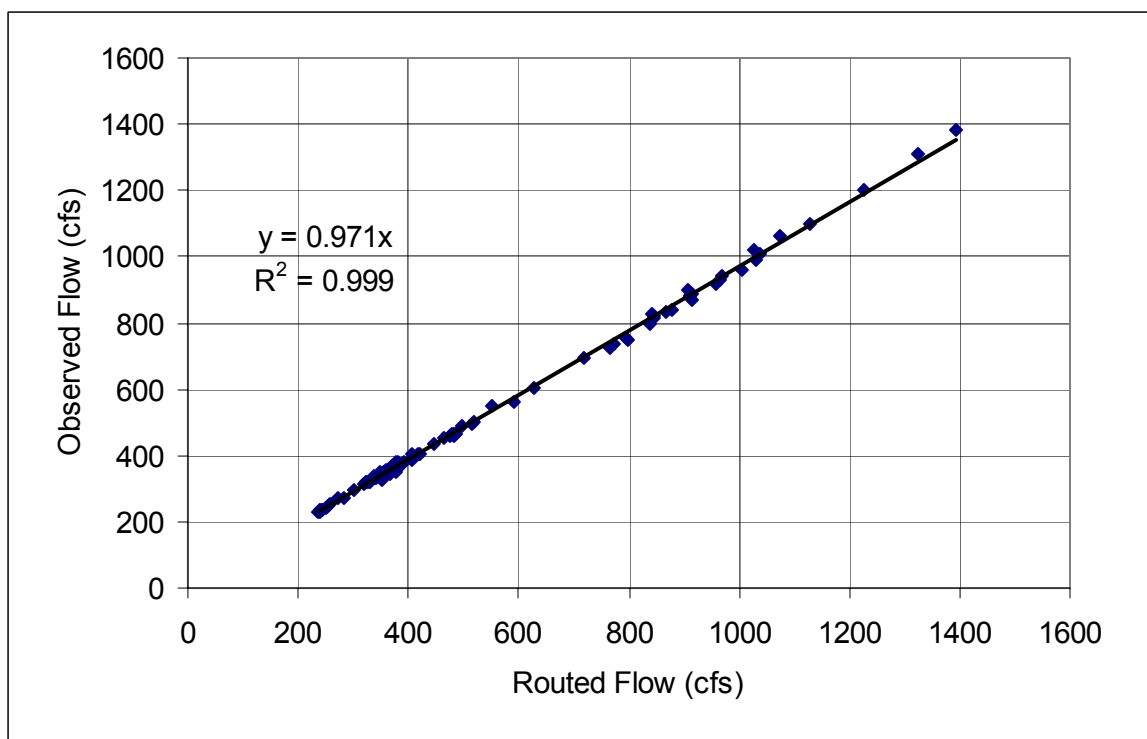
Graph 54. Observed flow versus routed flow, filtered for losses, Rio Grande near Arroyo Hondo to below Taos Junction Bridge, near Taos, May 1965-94.



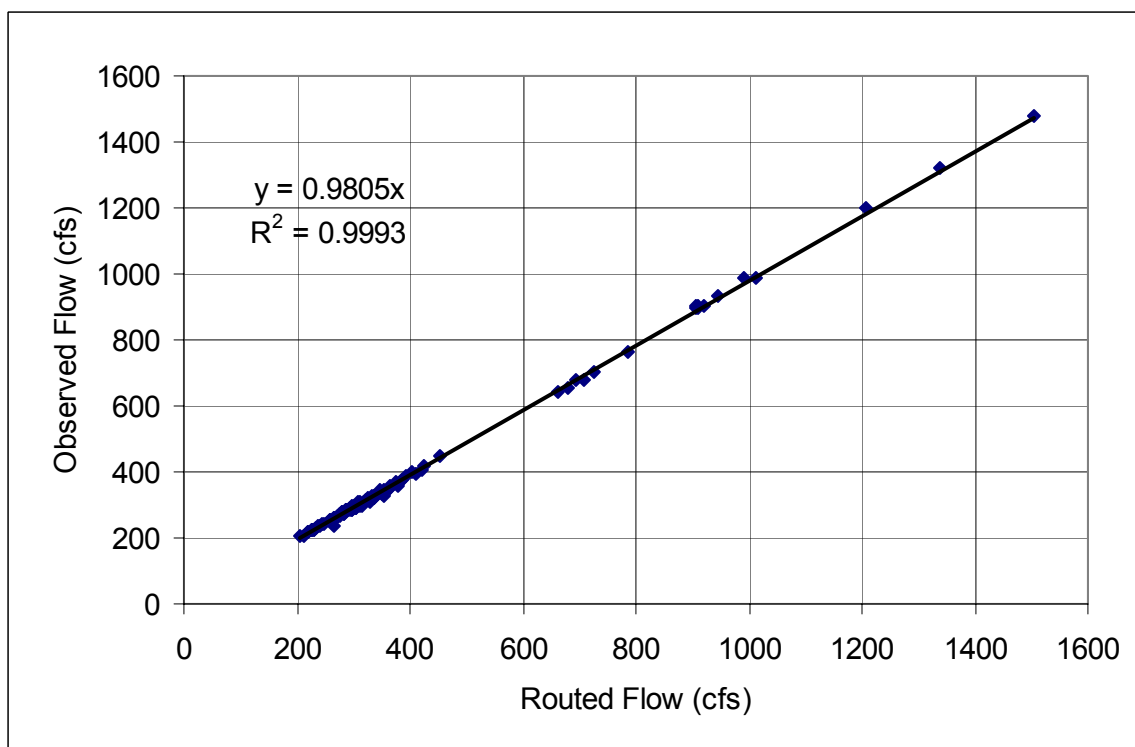
Graph 55. Observed flow versus routed flow, filtered for losses, Rio Grande near Arroyo Hondo to below Taos Junction Bridge, near Taos, June 1965-94.



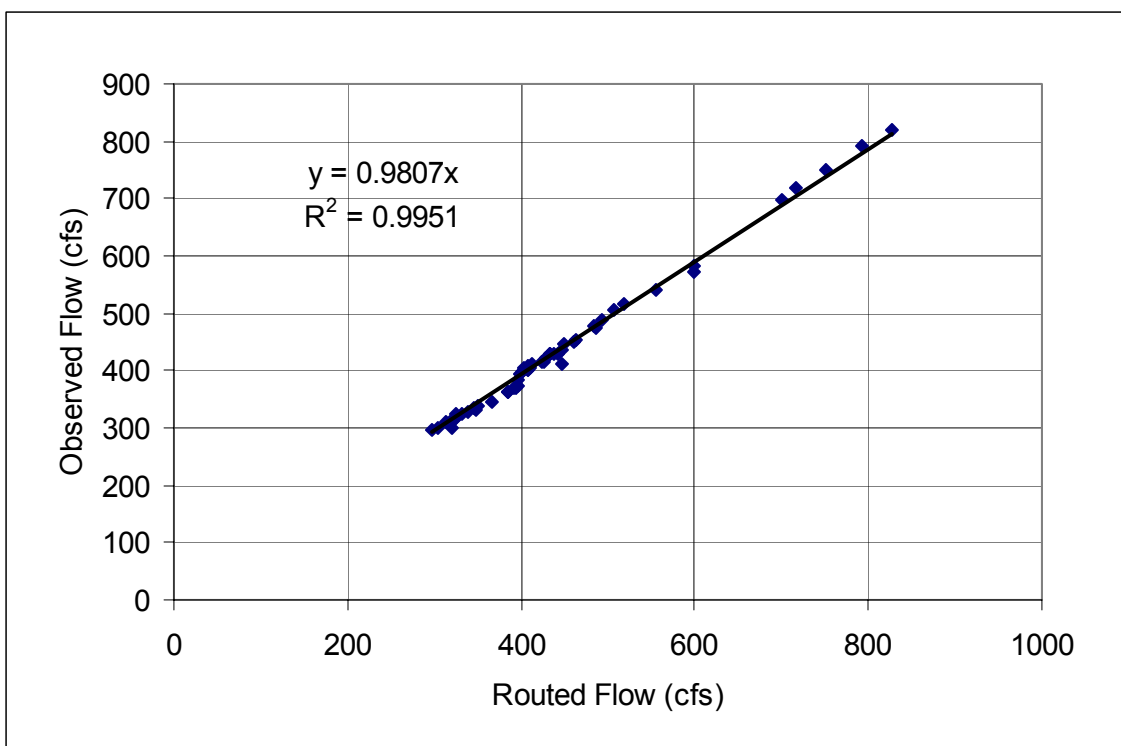
Graph 56. Observed flow versus routed flow, filtered for losses, Rio Grande near Arroyo Hondo to below Taos Junction Bridge, near Taos, July 1965-94.



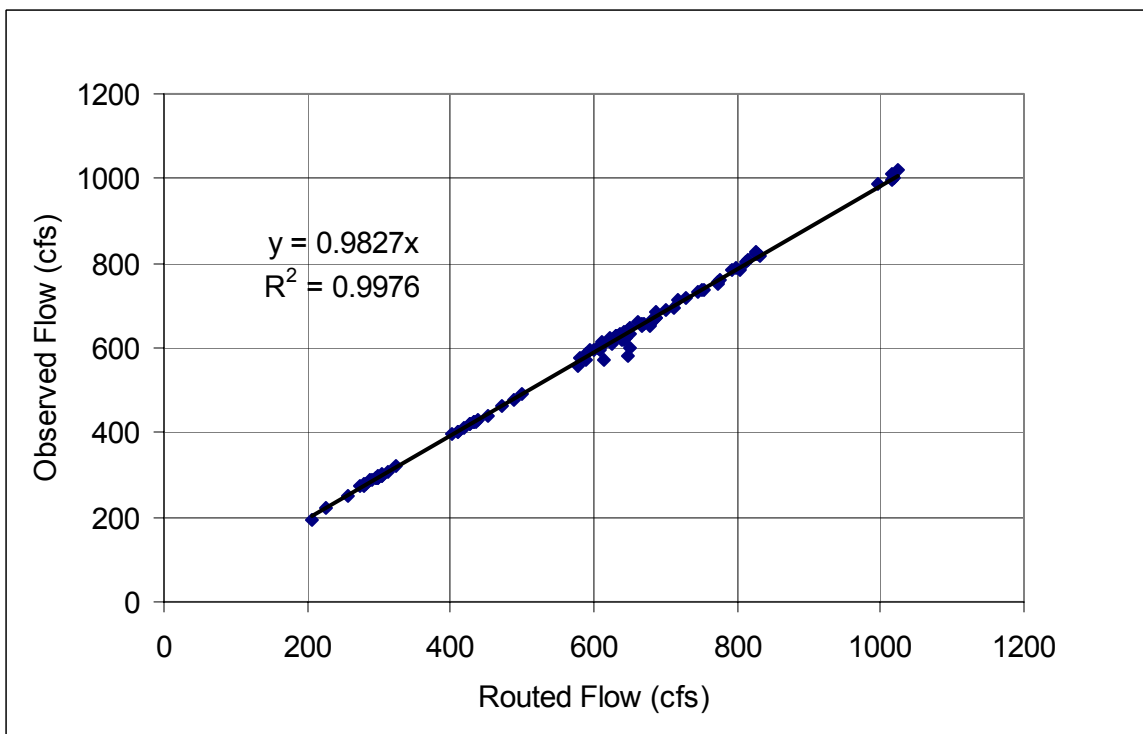
Graph 57. Observed flow versus routed flow, filtered for losses, Rio Grande near Arroyo Hondo to below Taos Junction Bridge, near Taos, August 1965-94.



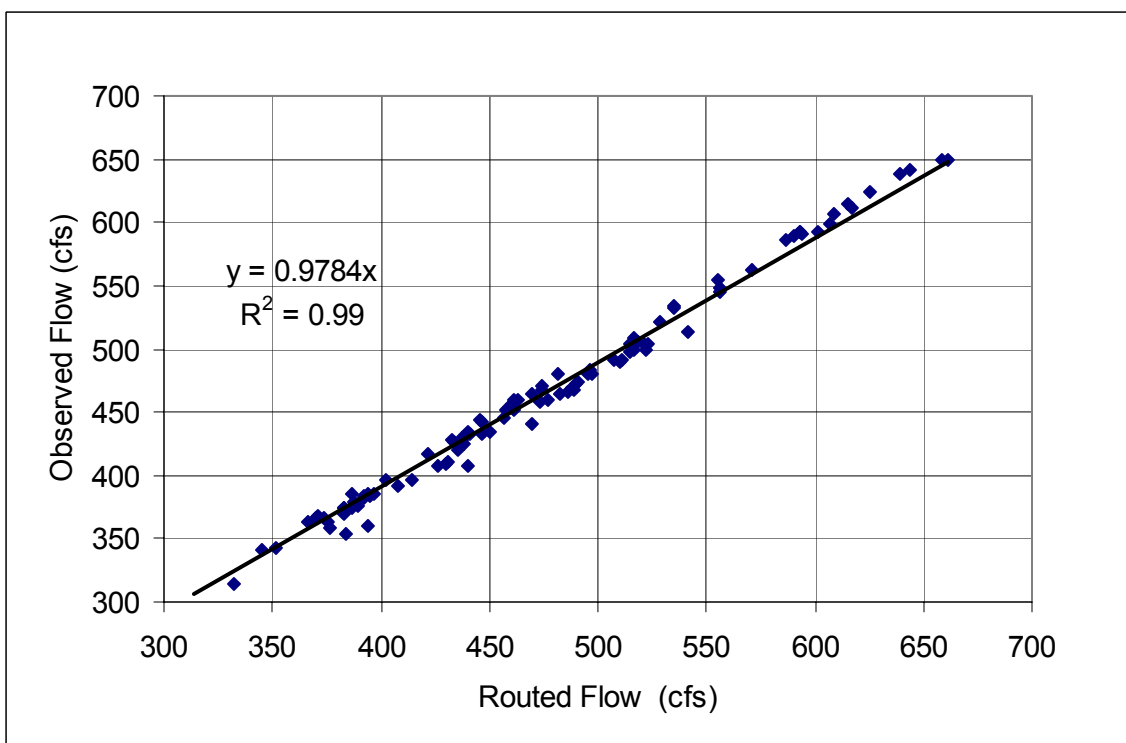
Graph 58. Observed flow versus routed flow, filtered for losses, Rio Grande near Arroyo Hondo to below Taos Junction Bridge, near Taos, September 1965-94.



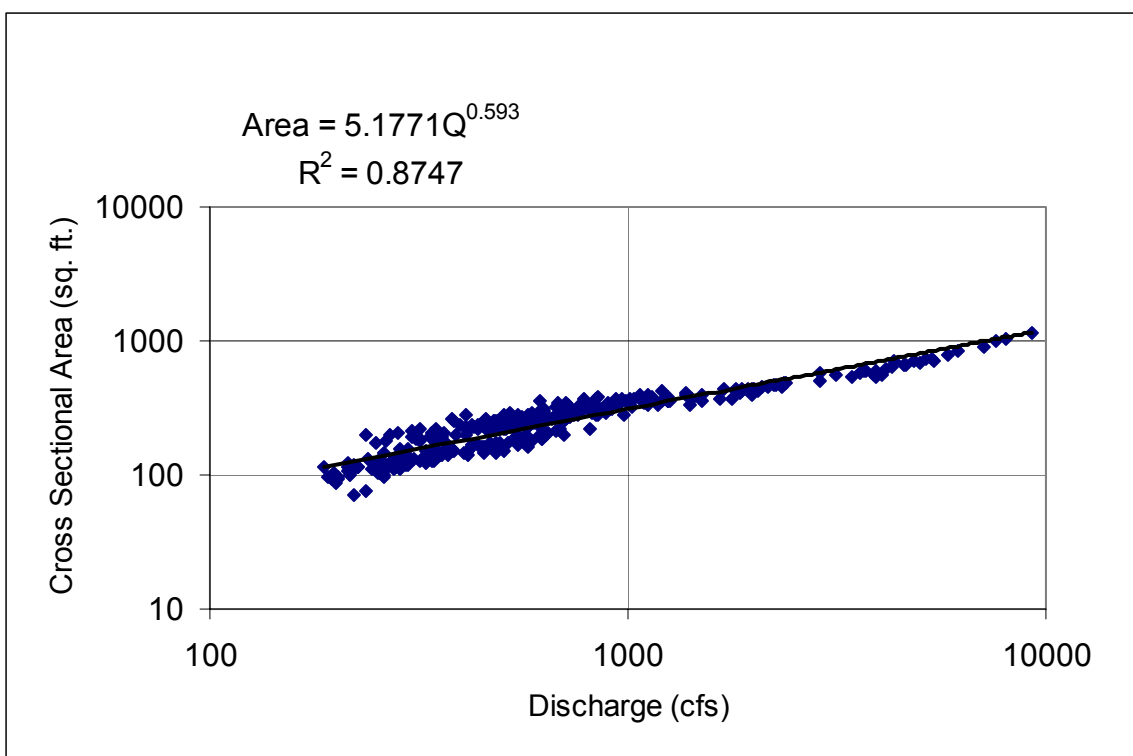
Graph 59. Observed flow versus routed flow, filtered for losses, Rio Grande near Arroyo Hondo to below Taos Junction Bridge, near Taos, October 1965-94.



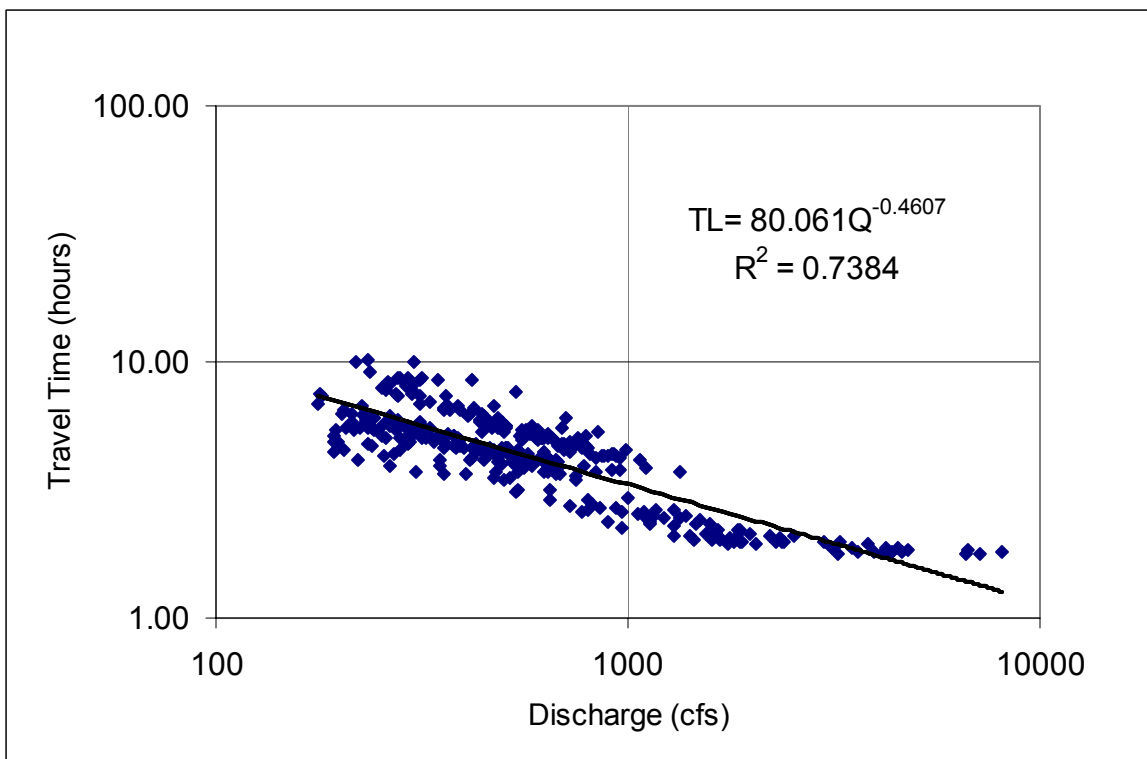
Graph 60. Observed flow versus routed flow, filtered for losses, Rio Grande near Arroyo Hondo to below Taos Junction Bridge, near Taos, November 1965-94.



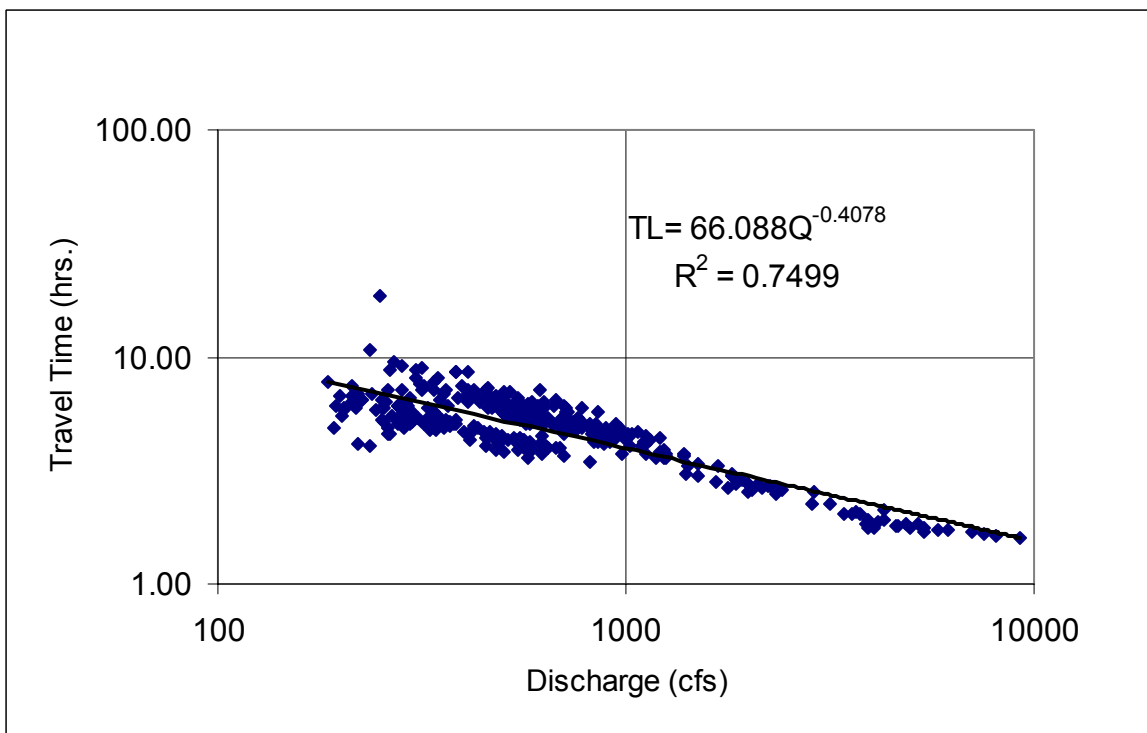
Graph 61. Observed flow versus routed flow, filtered for losses, Rio Grande near Arroyo Hondo to below Taos Junction Bridge, near Taos, December 1965-94.



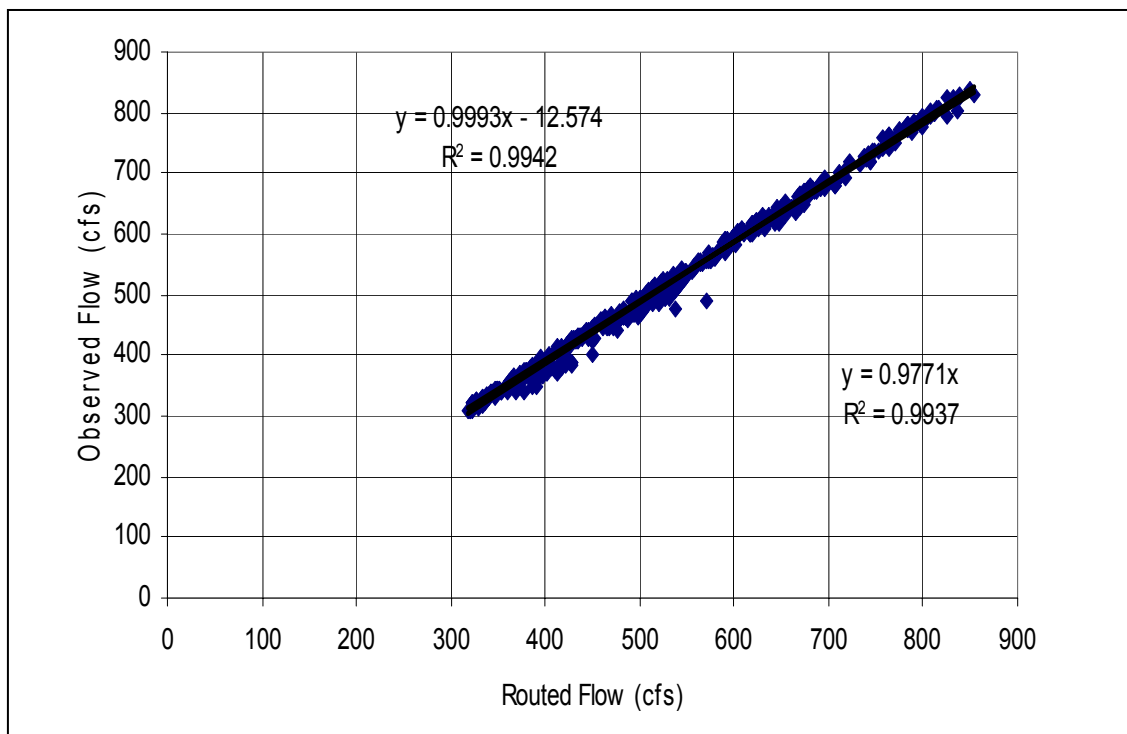
Graph 62. Cross section area versus discharge, Rio Grande at Embudo.



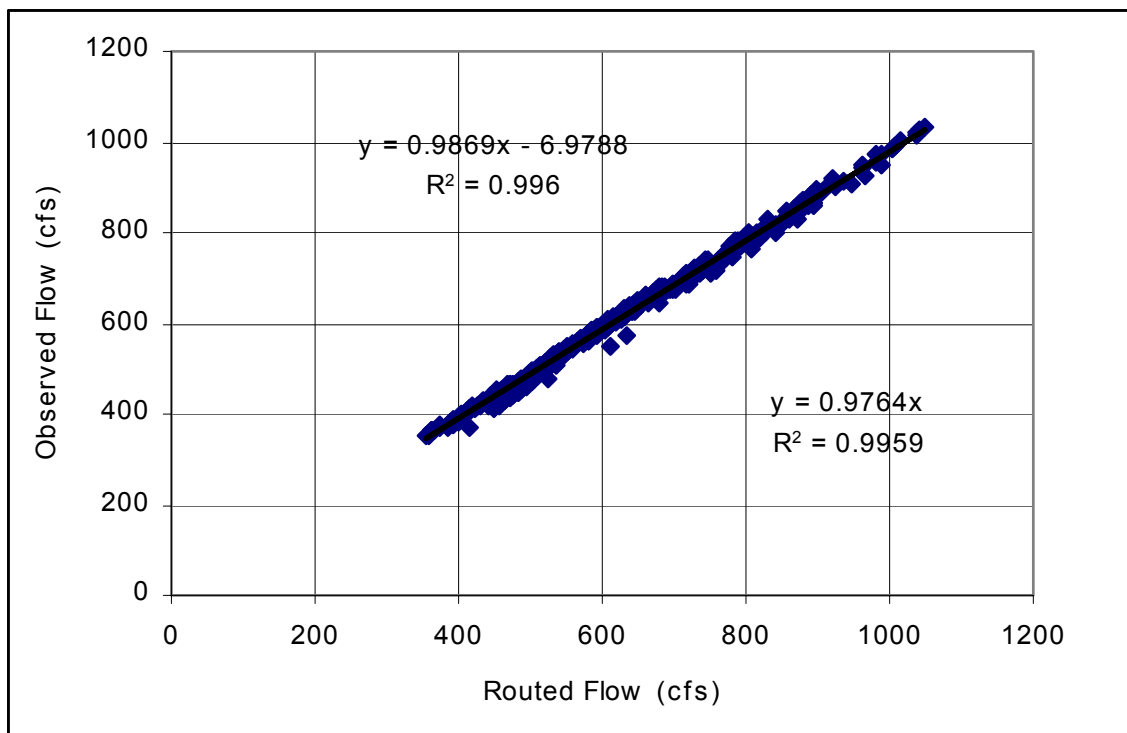
Graph 63. Travel time versus discharge, Rio Grande below Taos Junction Bridge, near Taos to Embudo (based on gage below Taos Junction Bridge, near Taos).



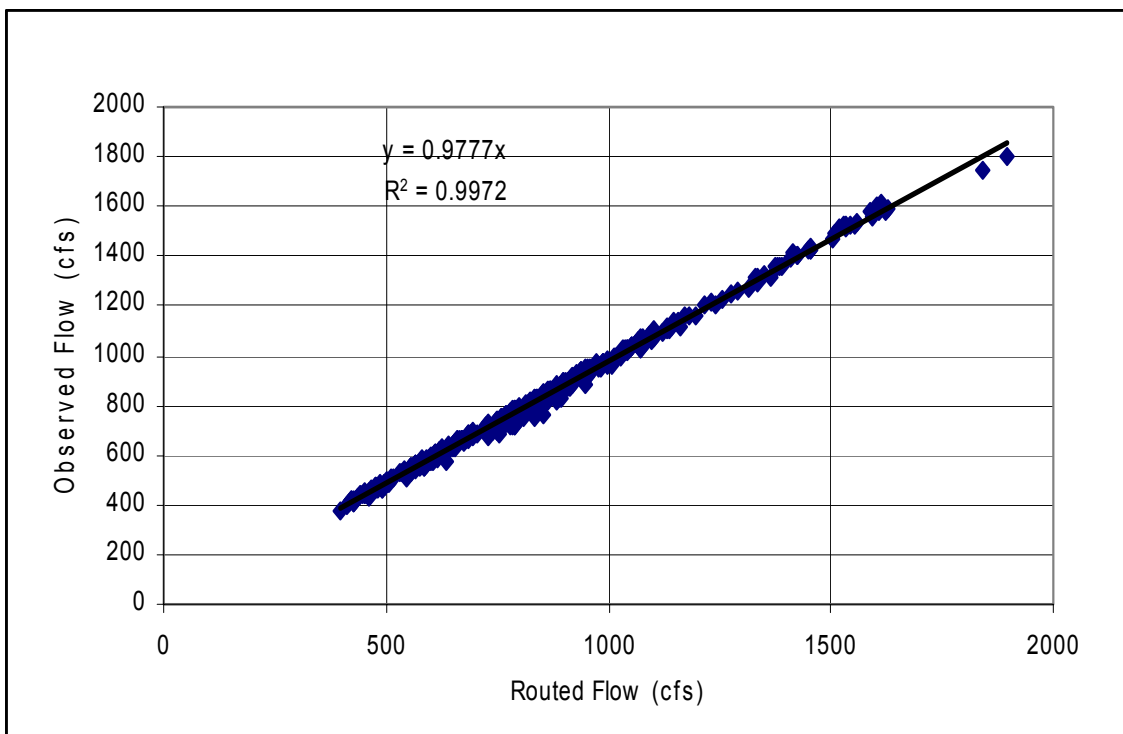
Graph 64. Travel time versus discharge, Rio Grande below Taos Junction Bridge, near Taos to Embudo (based on gage at Embudo).



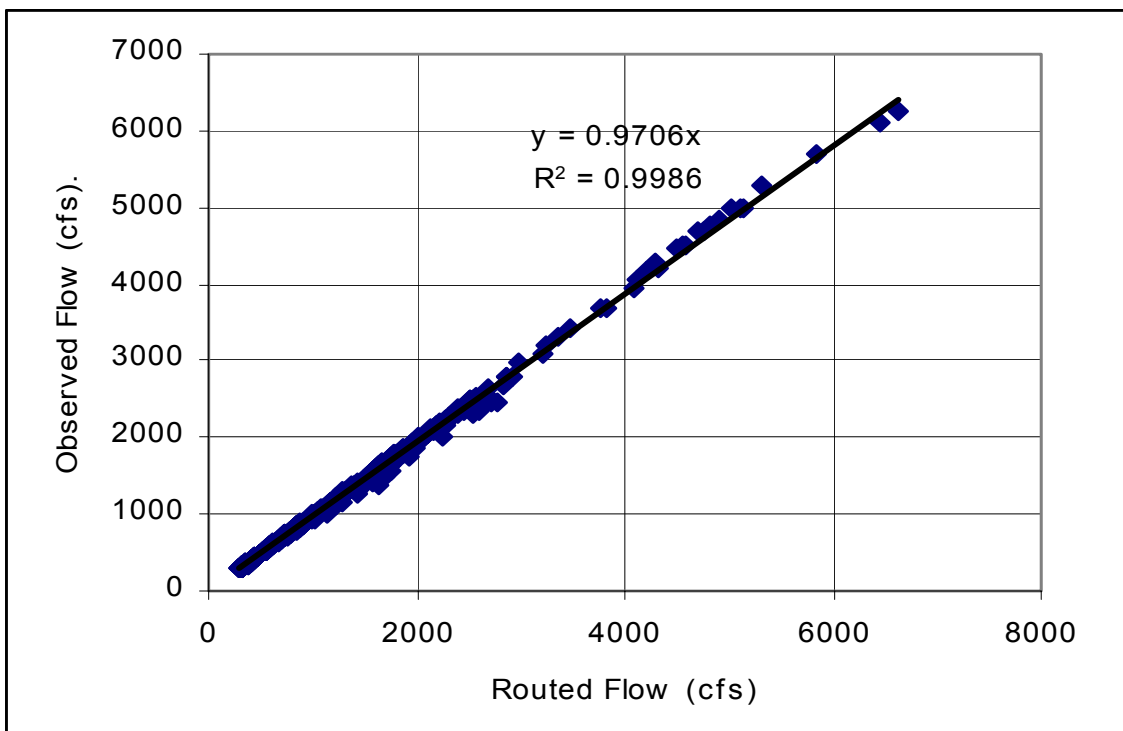
Graph 65. Observed flow versus routed flow, filtered for losses, Rio Grande below Taos Junction Bridge, near Taos to Embudo, January 1962-96.



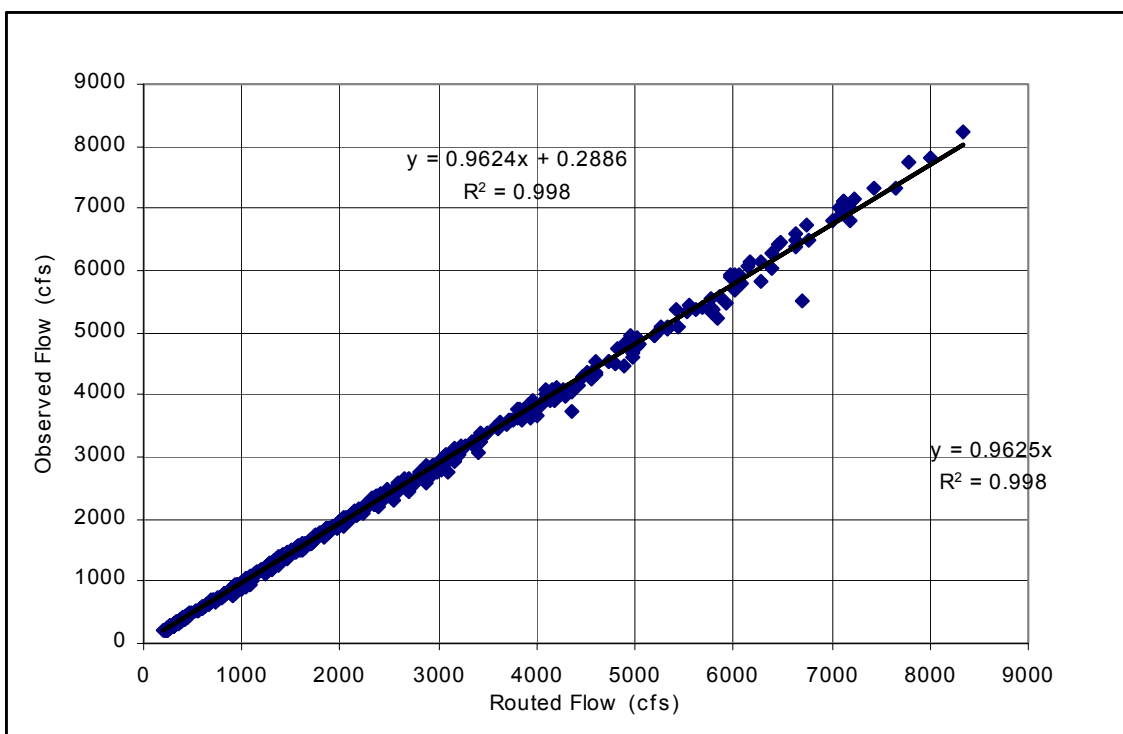
Graph 66. Observed flow versus routed flow, filtered for losses, Rio Grande below Taos Junction Bridge, near Taos to Embudo, February 1962-96.



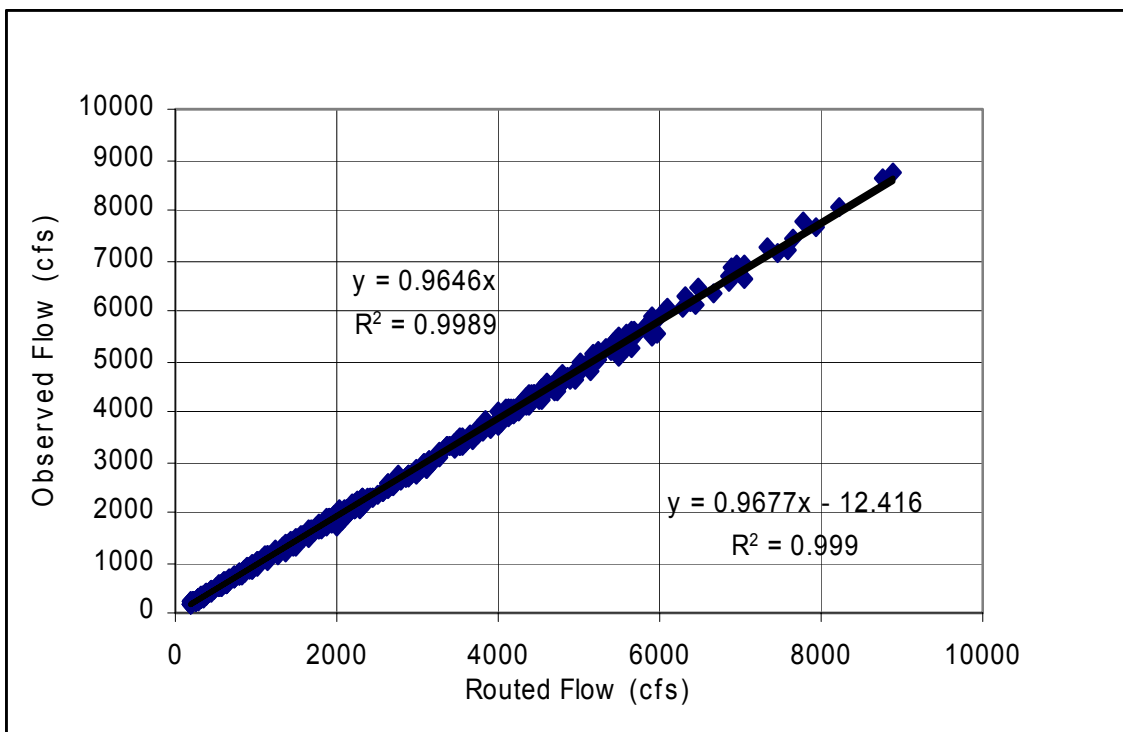
Graph 67. Observed flow versus routed flow, filtered for losses, Rio Grande below Taos Junction Bridge, near Taos to Embudo, March 1962-96.



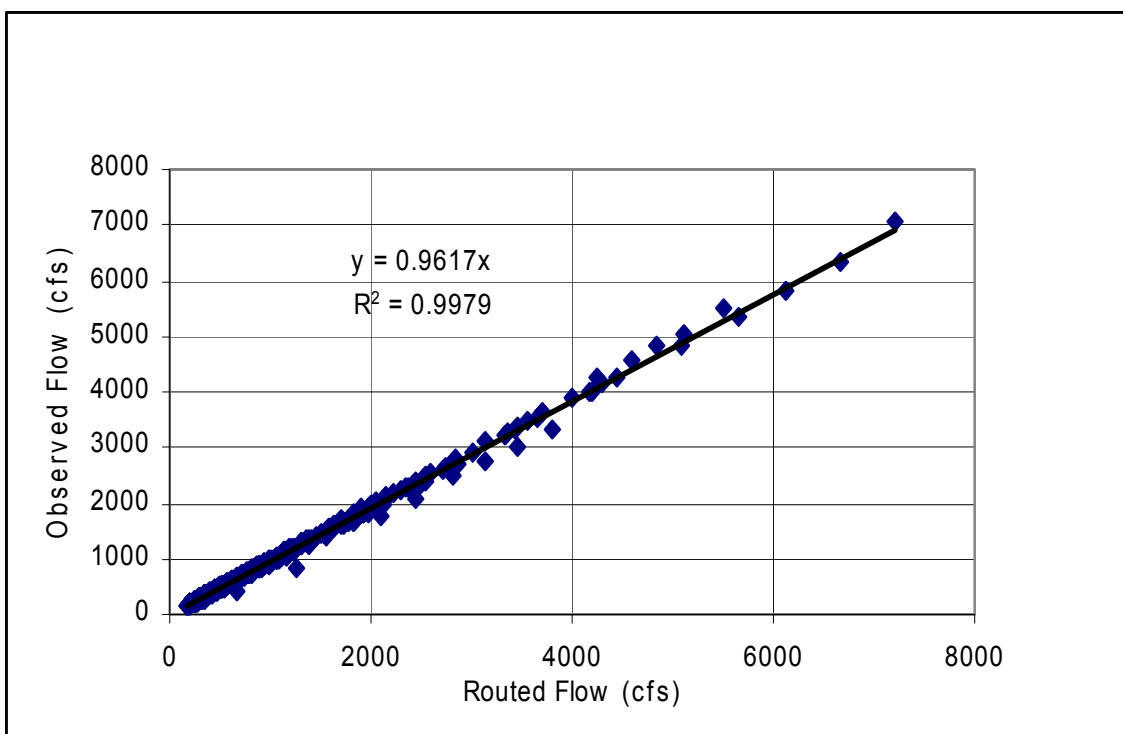
Graph 68. Observed flow versus routed flow, filtered for losses, Rio Grande below Taos Junction Bridge, near Taos to Embudo, April 1962-96.



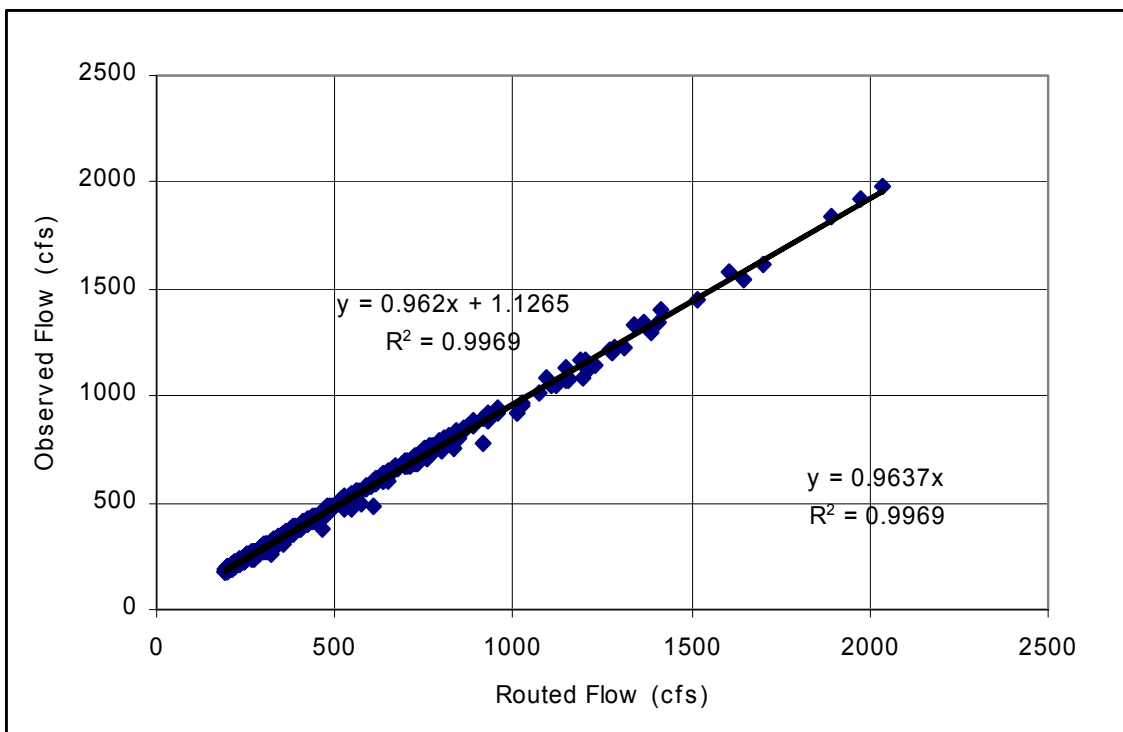
Graph 69. Observed flow versus routed flow, filtered for losses, Rio Grande below Taos Junction Bridge, near Taos to Embudo, May 1962-96.



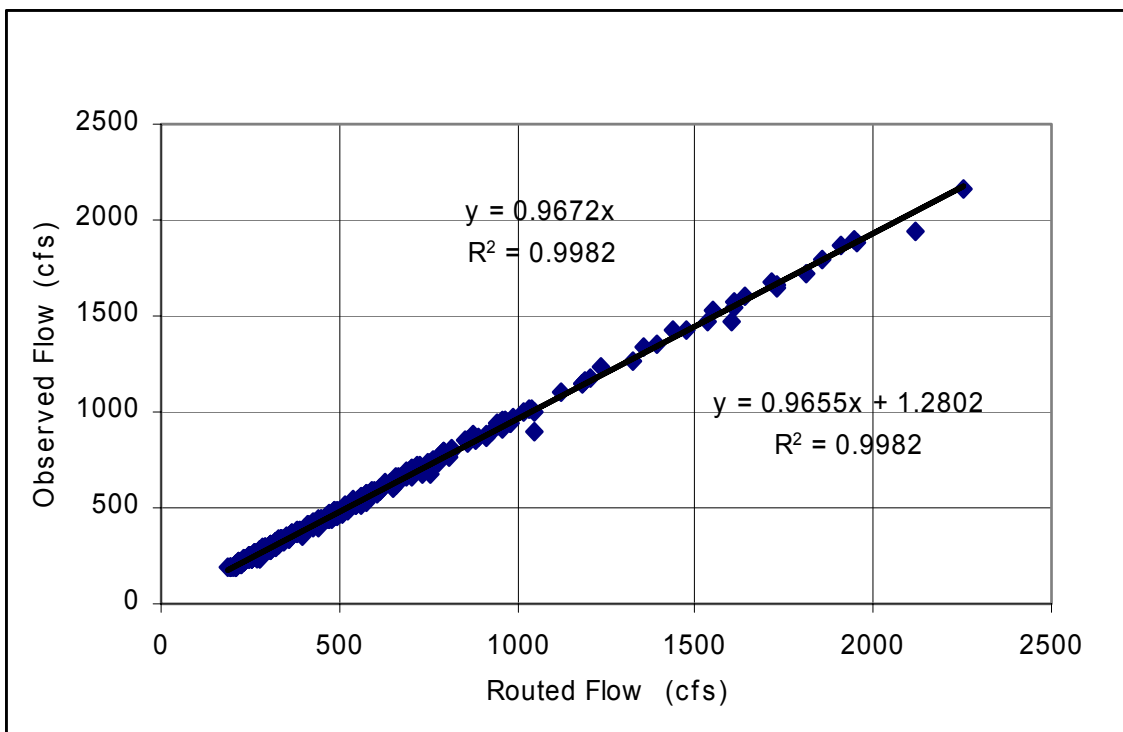
Graph 70. Observed flow versus routed flow, filtered for losses, Rio Grande below Taos Junction Bridge, near Taos to Embudo, June 1962-96.



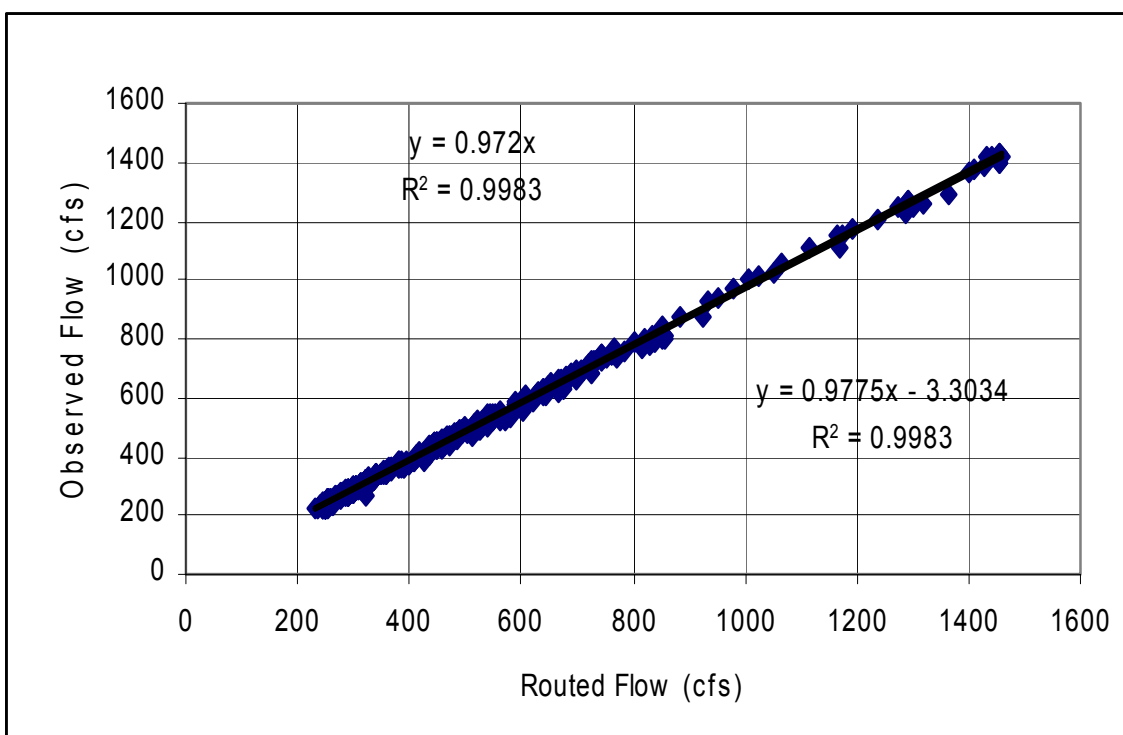
Graph 71. Observed flow versus routed flow, filtered for losses, Rio Grande below Taos Junction Bridge, near Taos to Embudo, July 1962-96.



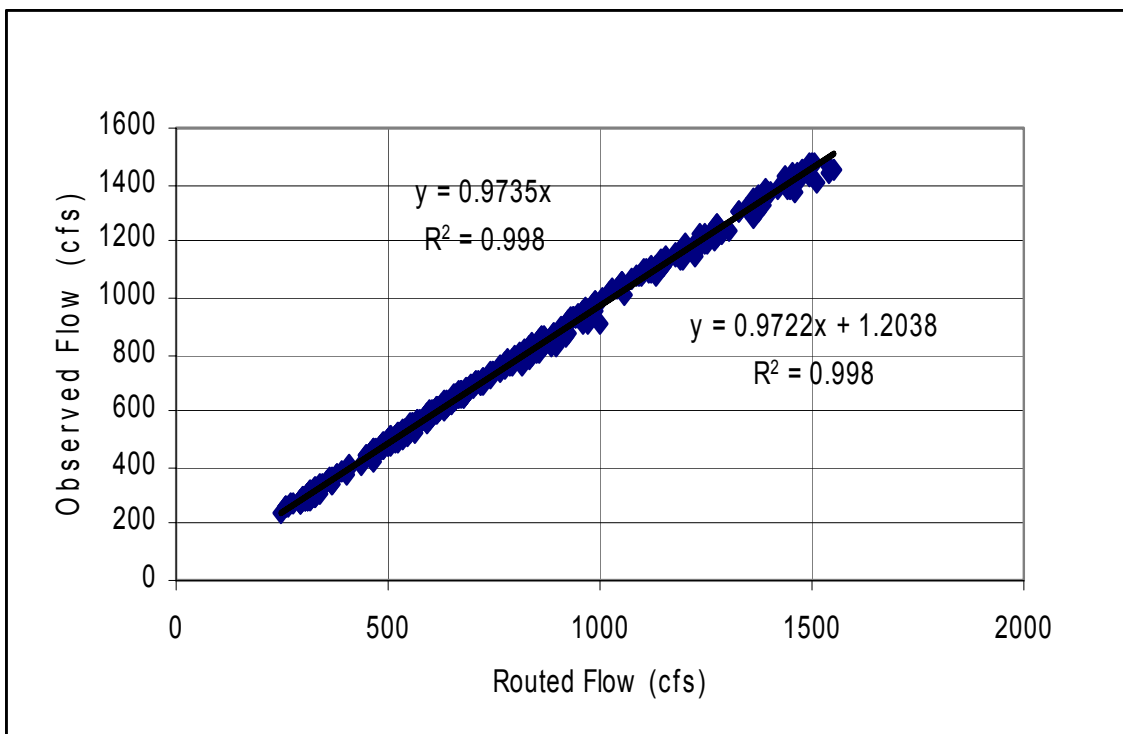
Graph 72. Observed flow versus routed flow, filtered for losses, Rio Grande below Taos Junction Bridge, near Taos to Embudo, August 1962-96.



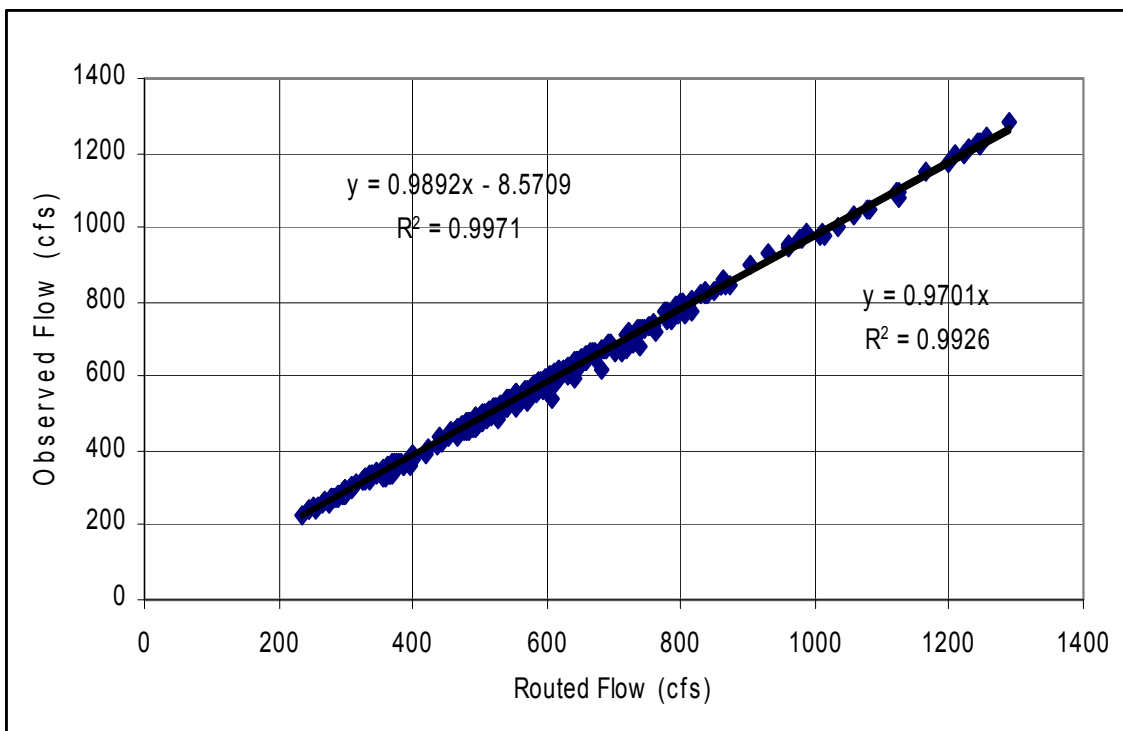
Graph 73. Observed flow versus routed flow, filtered for losses, Rio Grande below Taos Junction Bridge, near Taos to Embudo, September 1962-96.



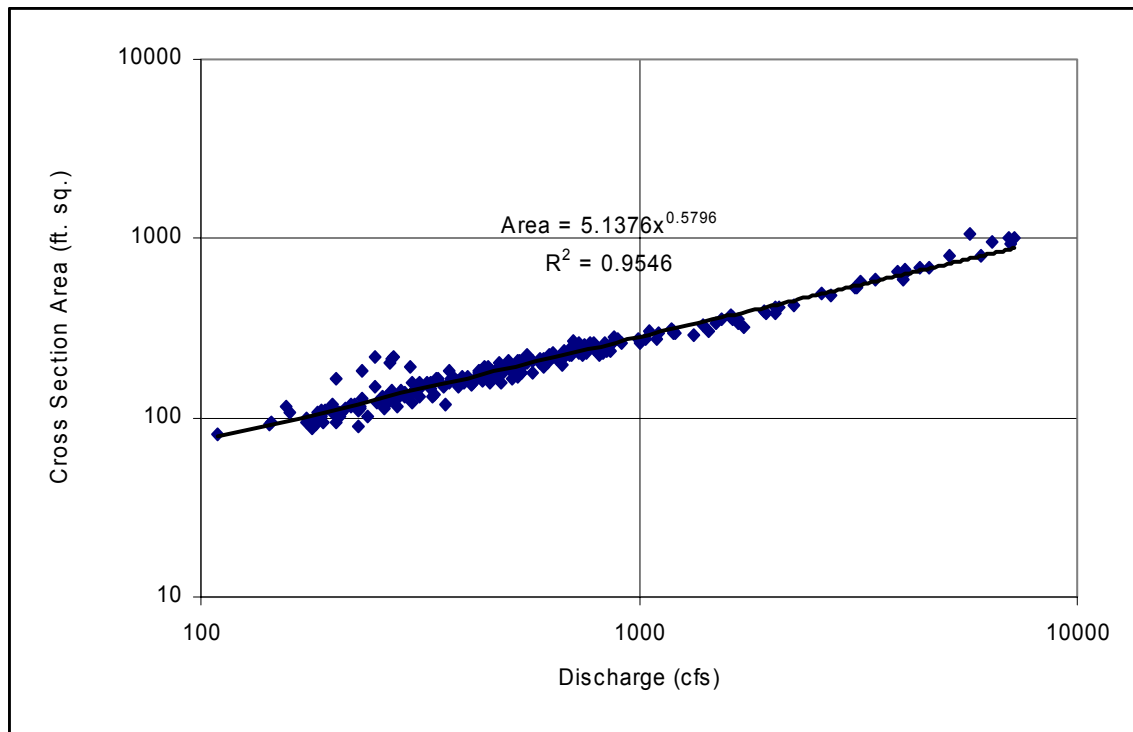
Graph 74. Observed flow versus routed flow, filtered for losses, Rio Grande below Taos Junction Bridge, near Taos to Embudo, October 1962-96.



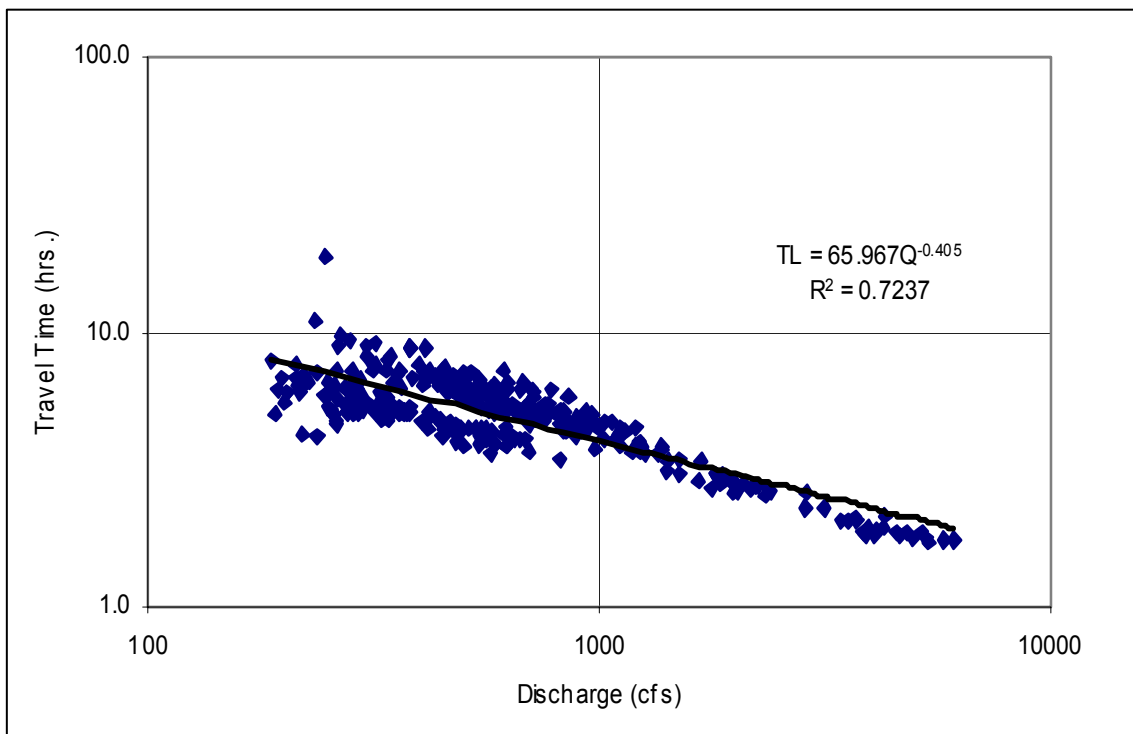
Graph 75. Observed flow versus routed flow, filtered for losses, Rio Grande below Taos Junction Bridge, near Taos to Embudo, November 1962-96.



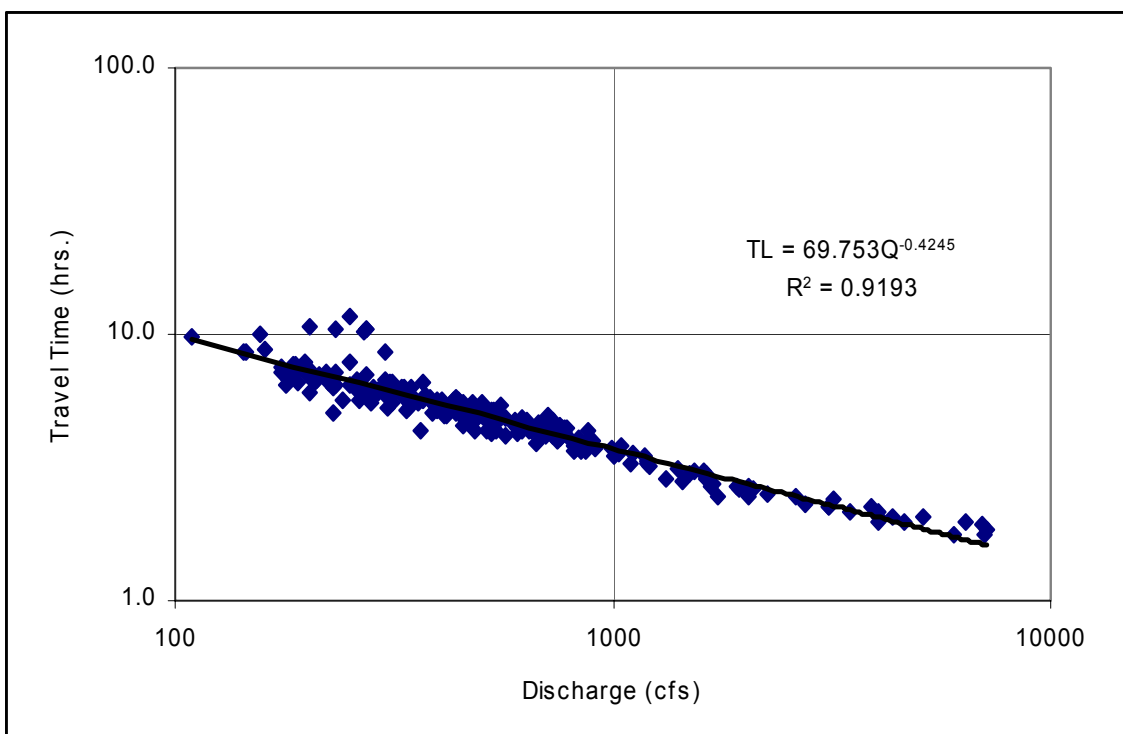
Graph 76. Observed flow versus routed flow, filtered for losses, Rio Grande below Taos Junction Bridge, near Taos to Embudo, December 1962-96.



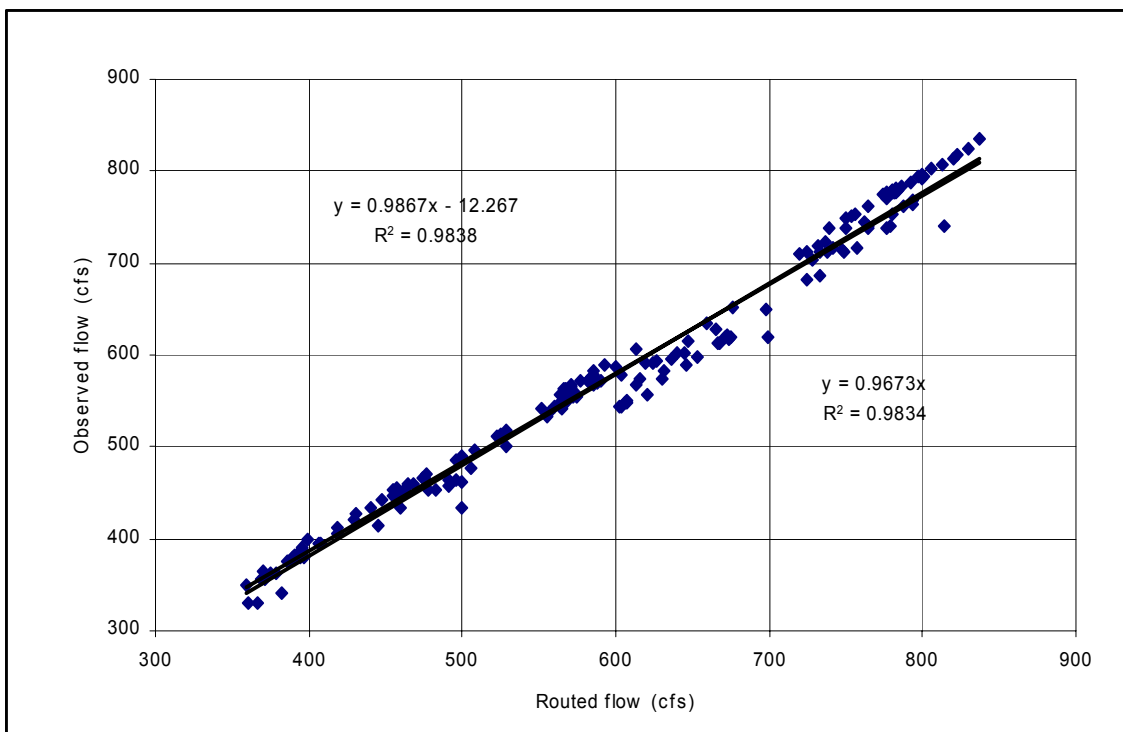
Graph 77. Cross section area versus discharge, Rio Grande above San Juan Pueblo.



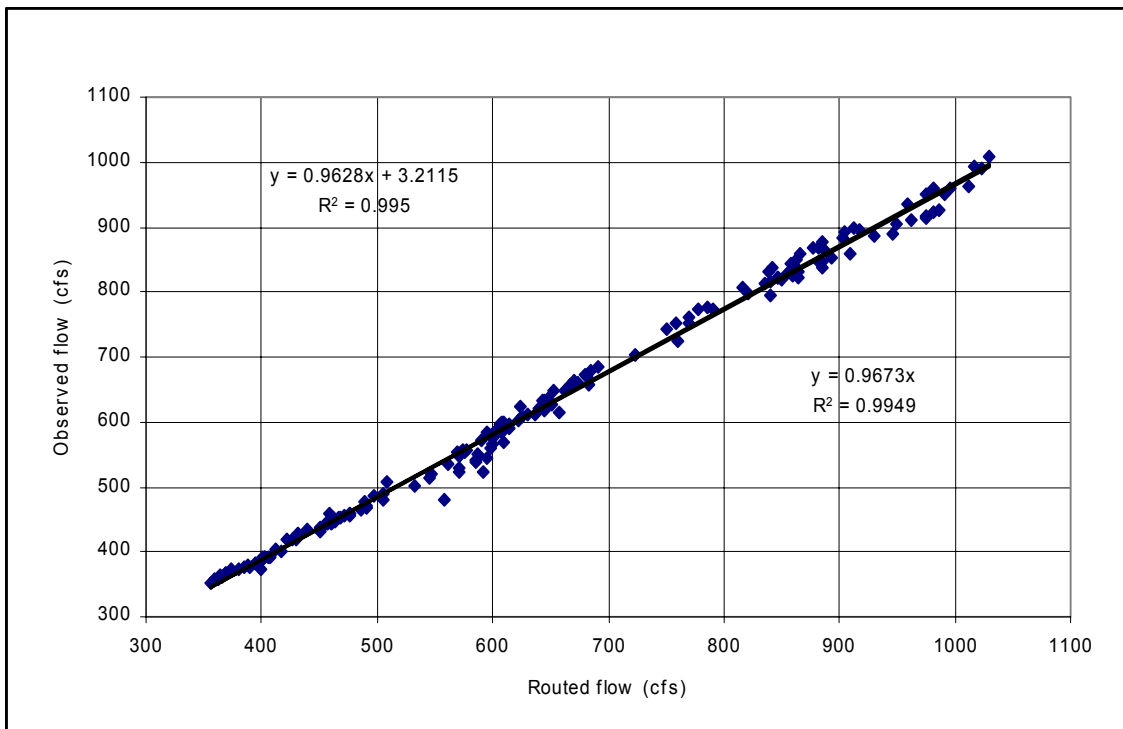
Graph 78. Travel time versus discharge, Rio Grande at Embudo to above San Juan Pueblo (based on gage at Embudo).



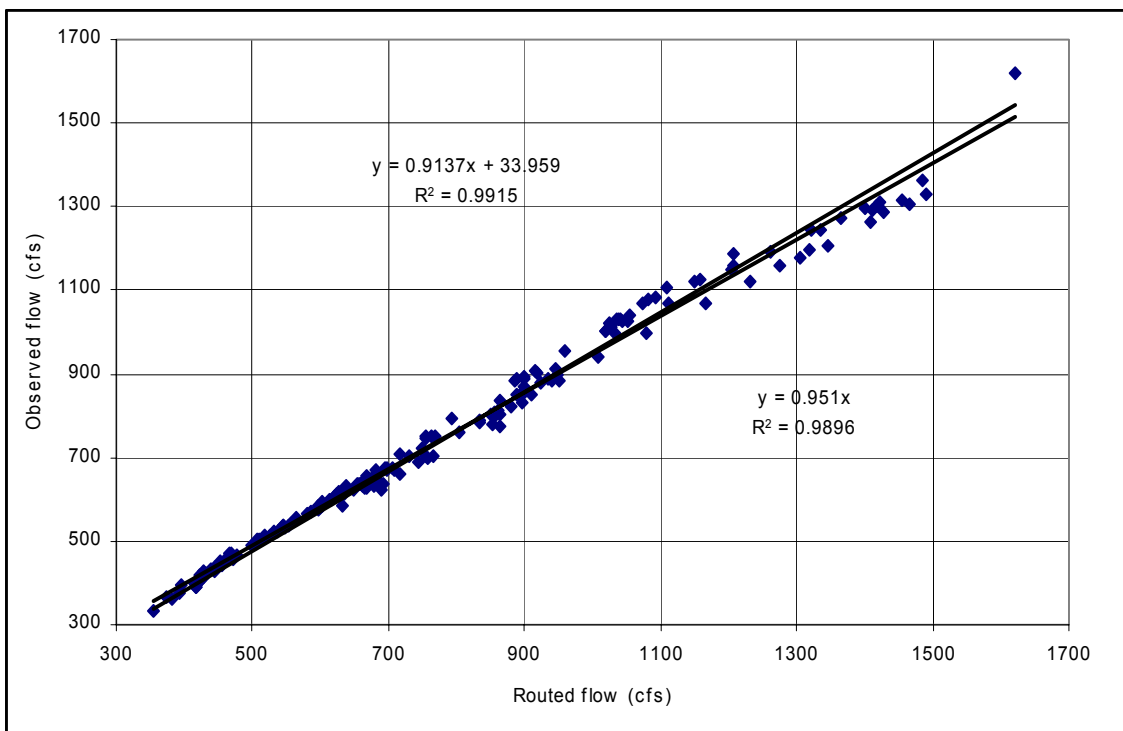
Graph 79. Travel time versus discharge, Rio Grande at Embudo to above San Juan Pueblo (based on gage above San Juan Pueblo).



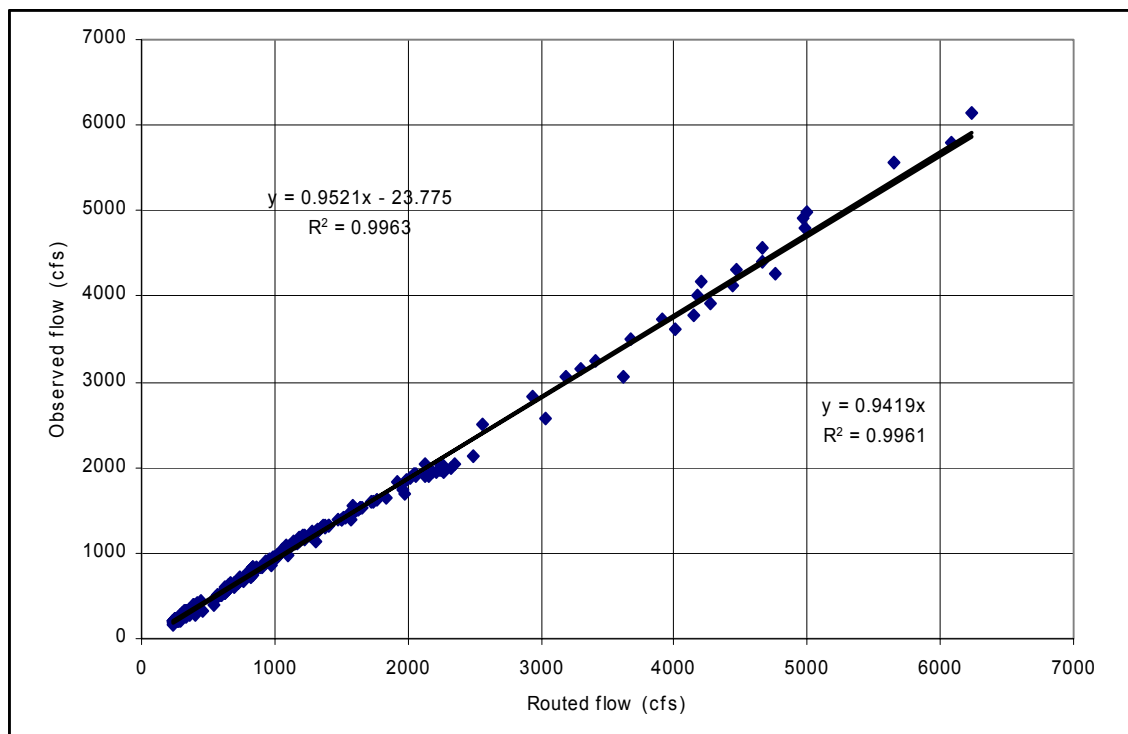
Graph 80. Observed flow versus routed flow, filtered for losses, Rio Grande at Embudo to above San Juan Pueblo, January 1976-86.



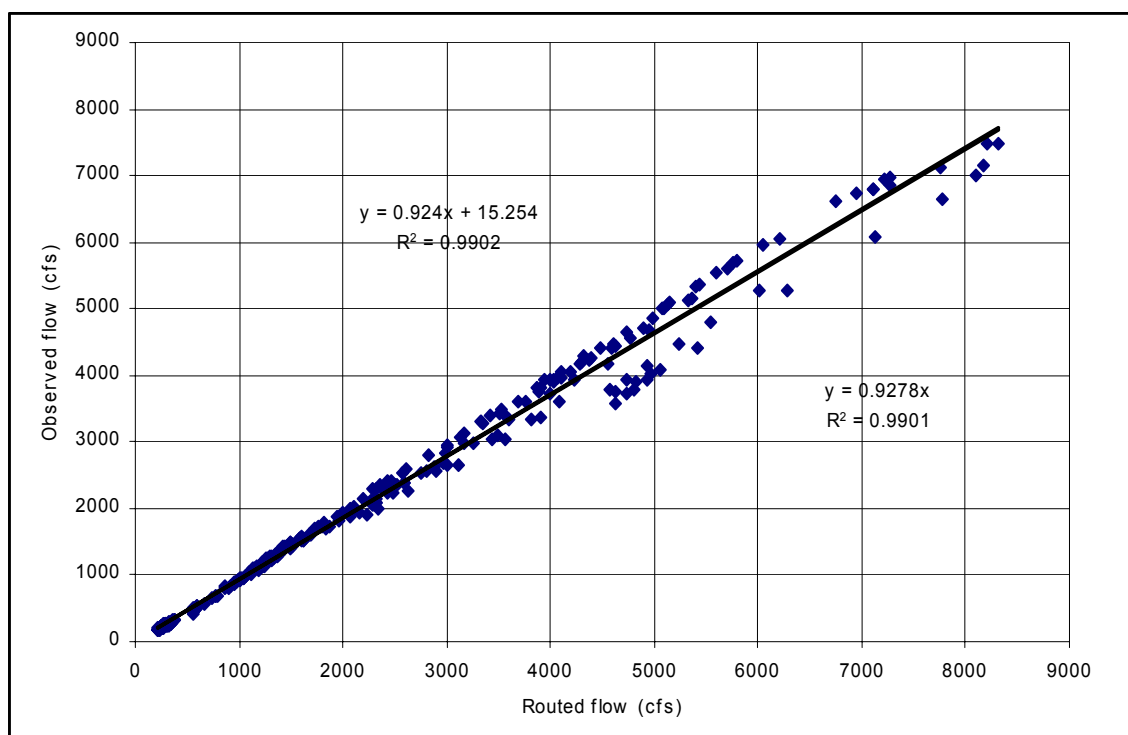
Graph 81. Observed flow versus routed flow, filtered for losses, Rio Grande at Embudo to above San Juan Pueblo, February 1976-86.



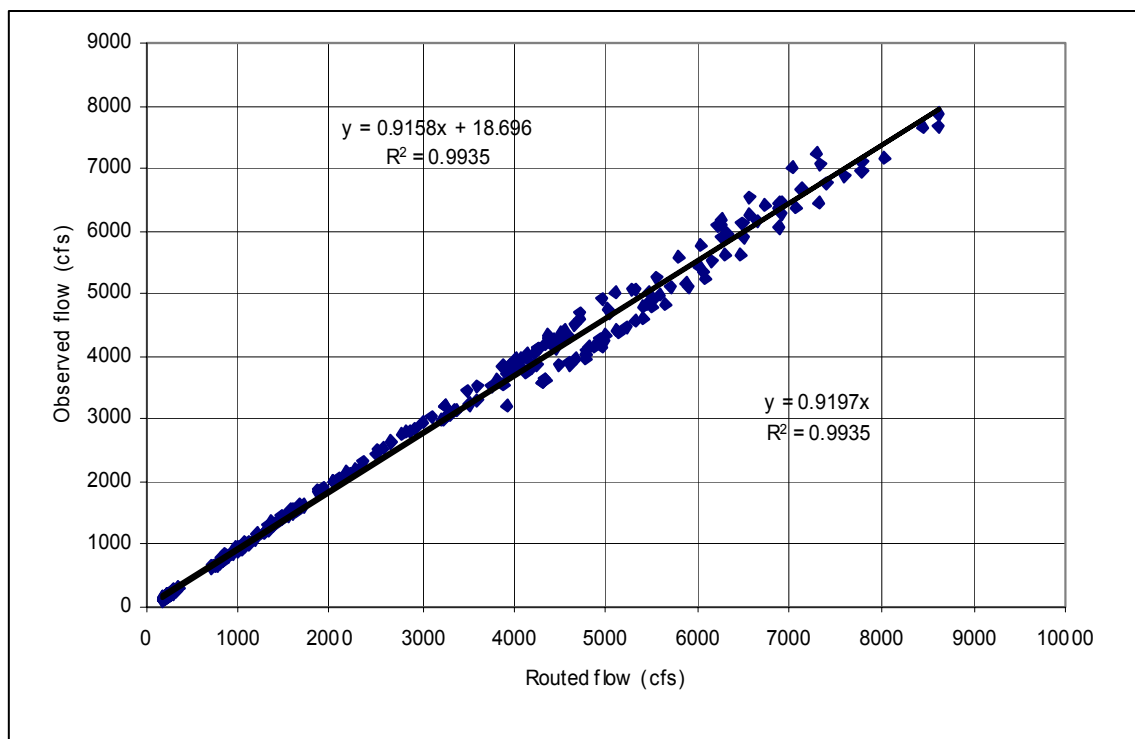
Graph 82. Observed flow versus routed flow, filtered for losses, Rio Grande at Embudo to above San Juan Pueblo, March 1976-86.



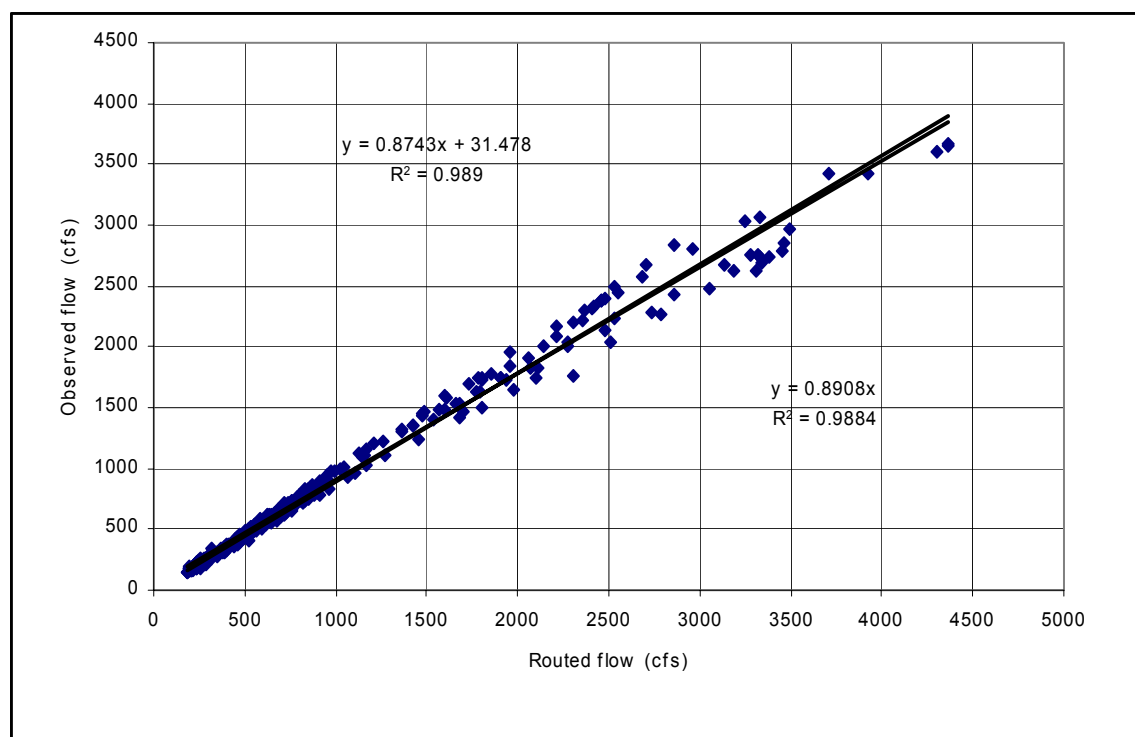
Graph 83. Observed flow versus routed flow, filtered for losses, Rio Grande at Embudo to above San Juan Pueblo, April 1976-86.



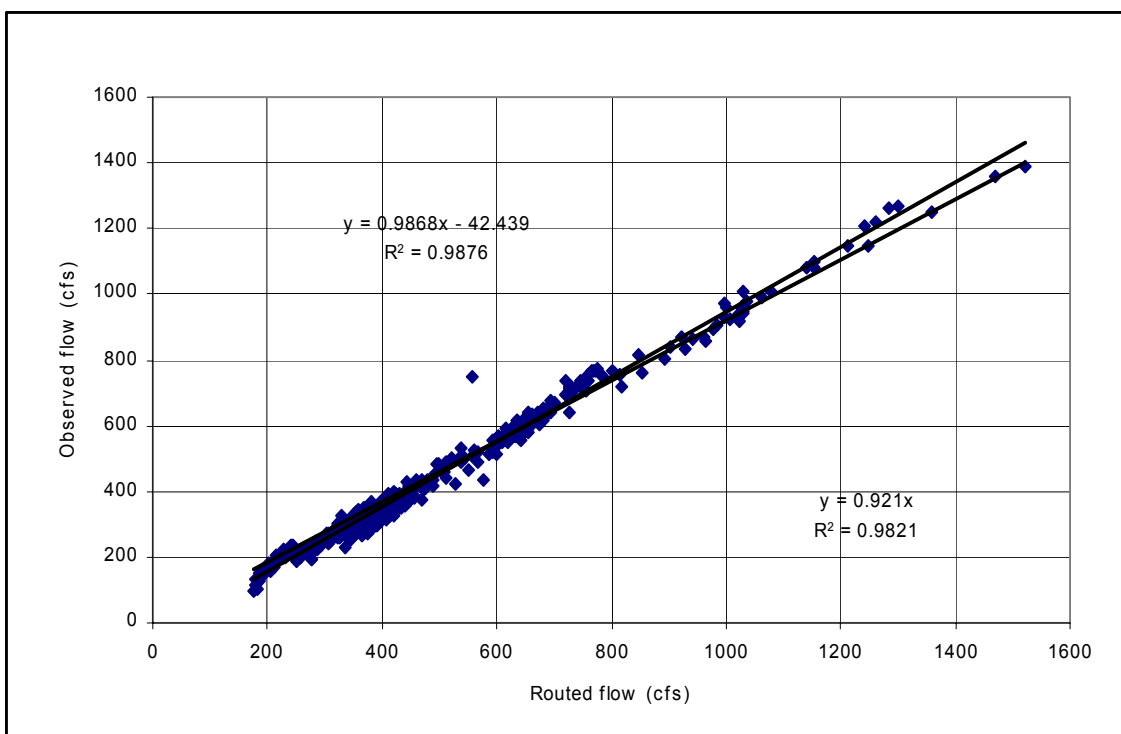
Graph 84. Observed flow versus routed flow, filtered for losses, Rio Grande at Embudo to above San Juan Pueblo, May 1976-86.



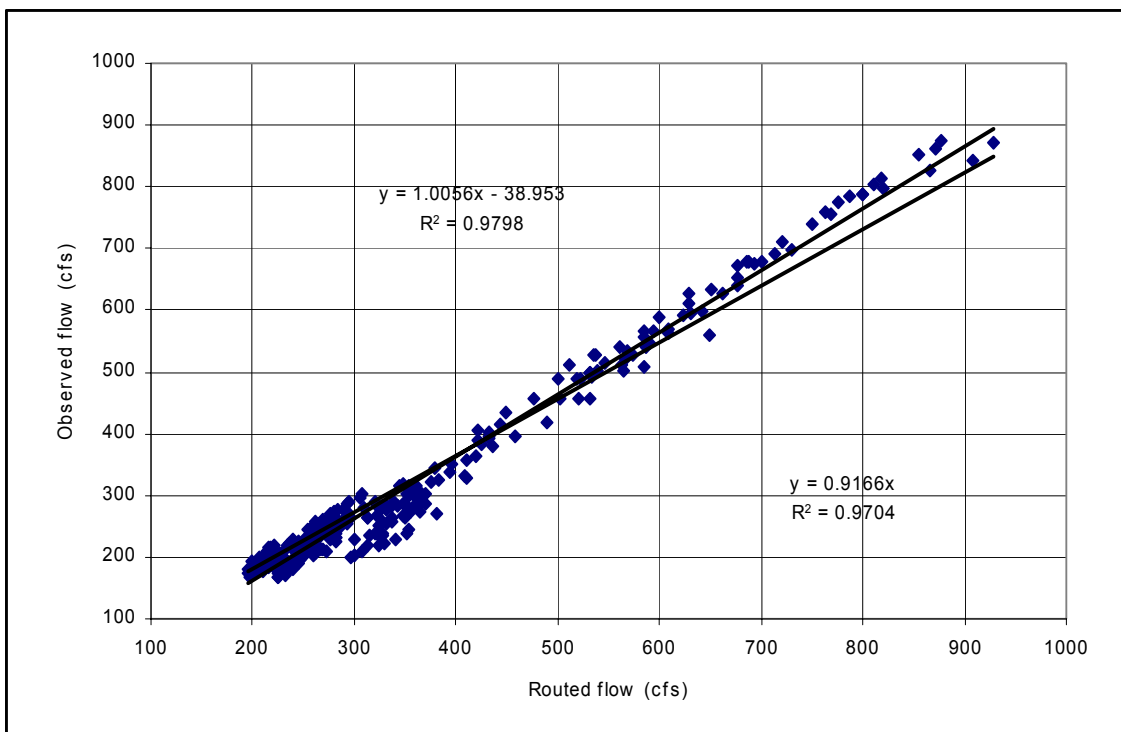
Graph 85. Observed flow versus routed flow, filtered for losses, Rio Grande at Embudo to above San Juan Pueblo, June 1976-86.



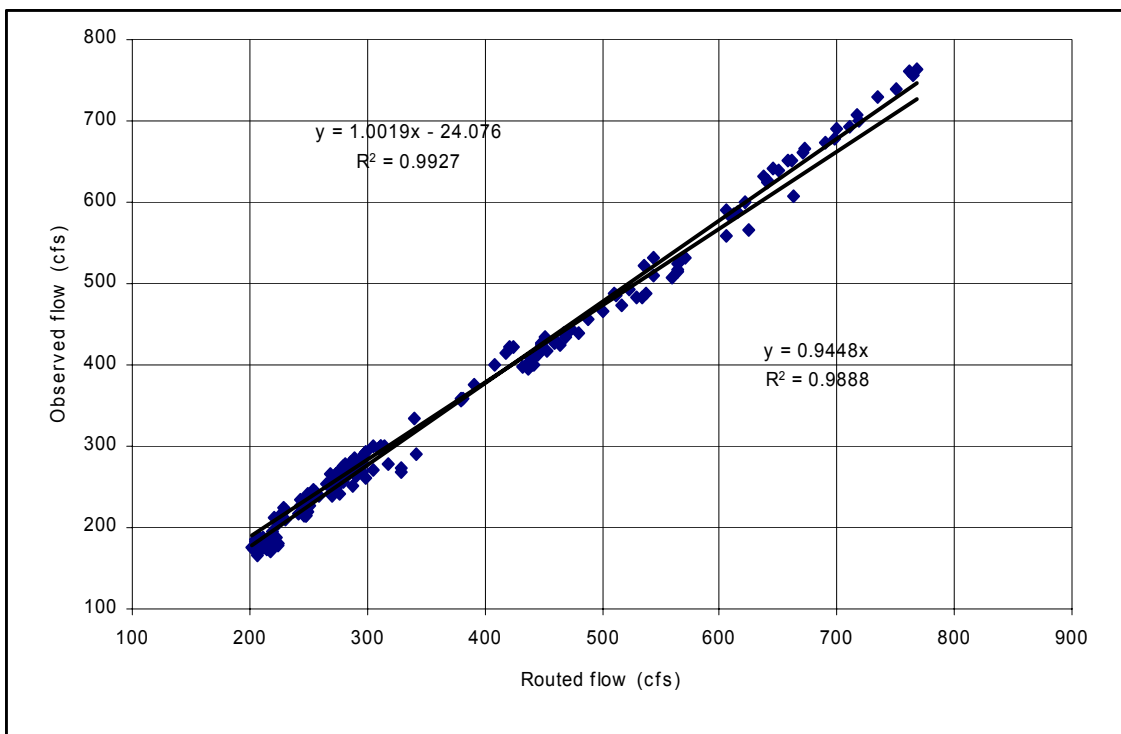
Graph 86. Observed flow versus routed flow, filtered for losses, Rio Grande at Embudo to above San Juan Pueblo, July 1976-86.



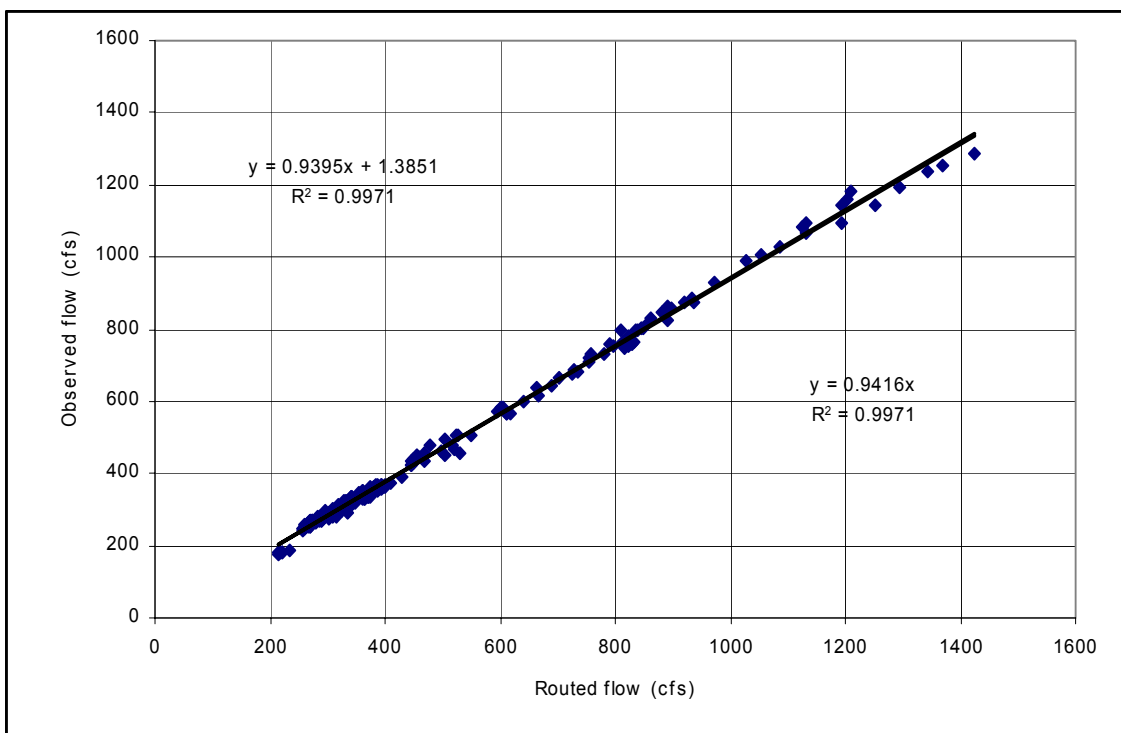
Graph 87. Observed flow versus routed flow, filtered for losses, Rio Grande at Embudo to above San Juan Pueblo, August 1976-86.



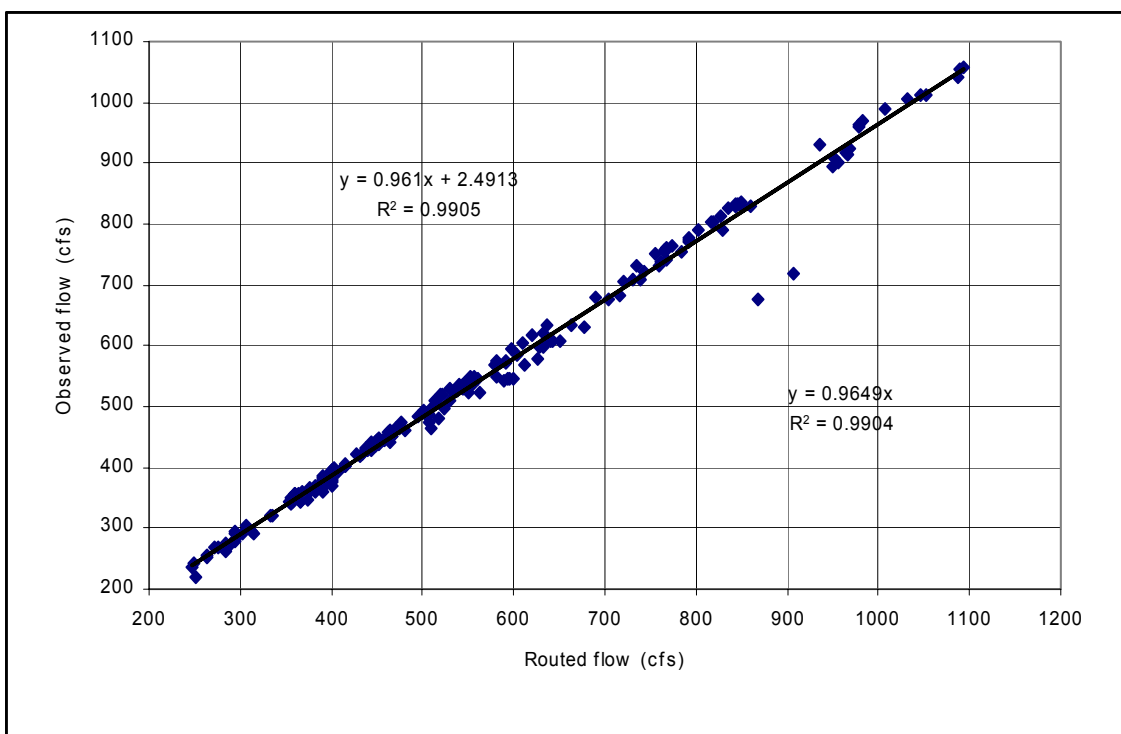
Graph 88. Observed flow versus routed flow, filtered for losses, Rio Grande at Embudo to above San Juan Pueblo, September 1976-86.



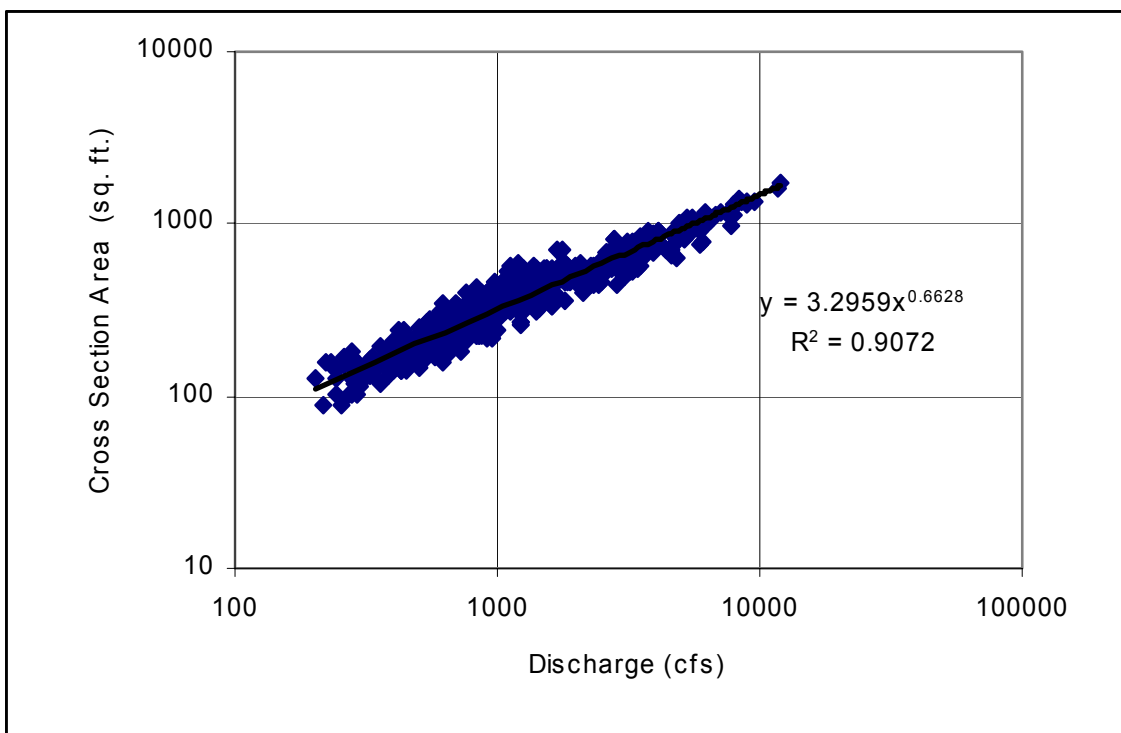
Graph 89. Observed flow versus routed flow, filtered for losses, Rio Grande at Embudo to above San Juan Pueblo, October 1976-86.



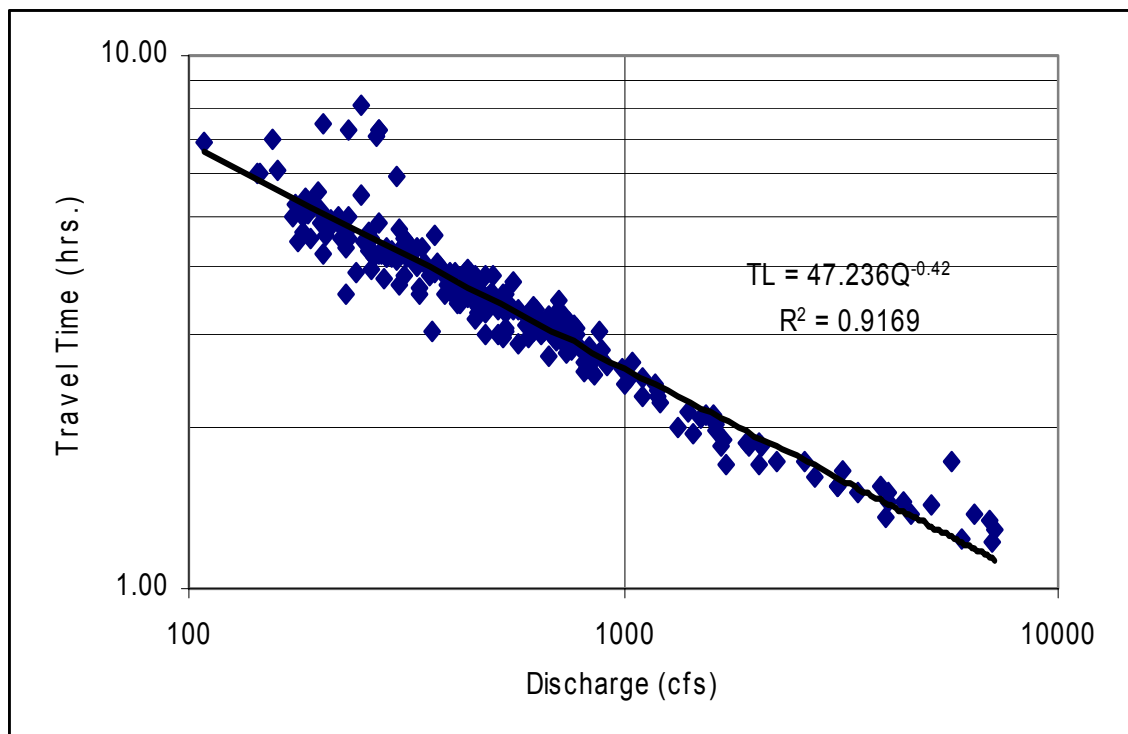
Graph 90. Observed flow versus routed flow, filtered for losses, Rio Grande at Embudo to above San Juan Pueblo, November 1976-86.



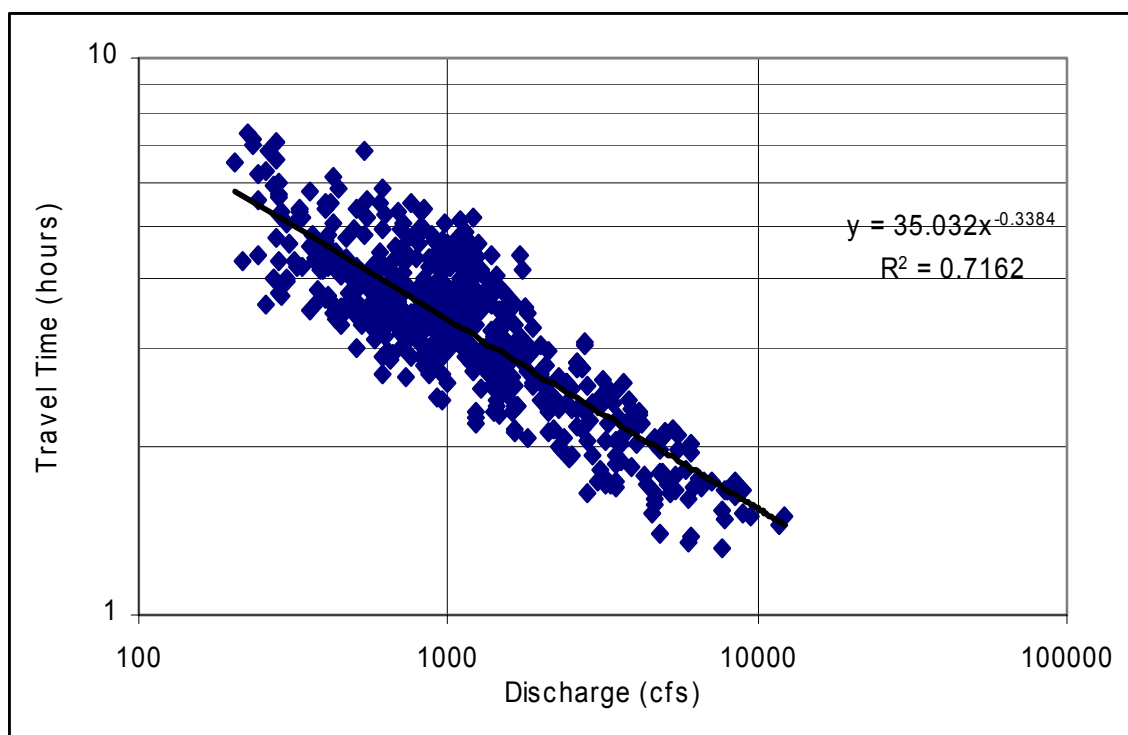
Graph 91. Observed flow versus routed flow, filtered for losses, Rio Grande at Embudo to above San Juan Pueblo, December 1976-86.



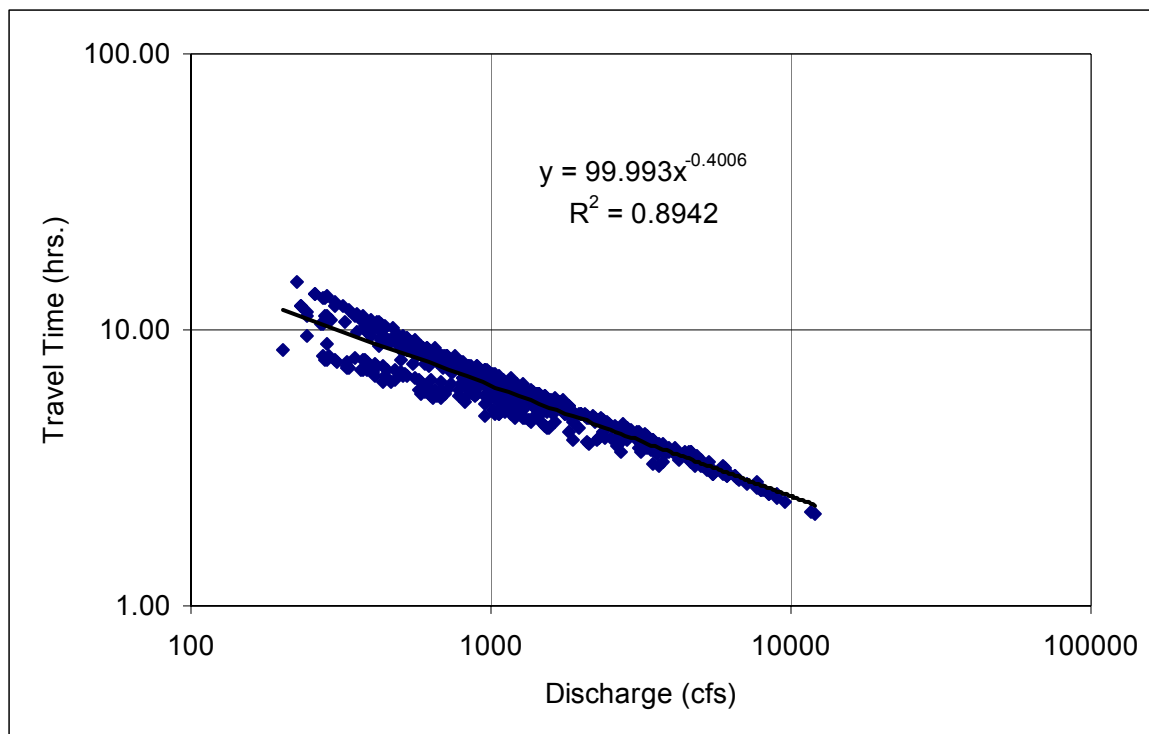
Graph 92. Cross section area versus discharge, Rio Grande at Otowi Bridge.



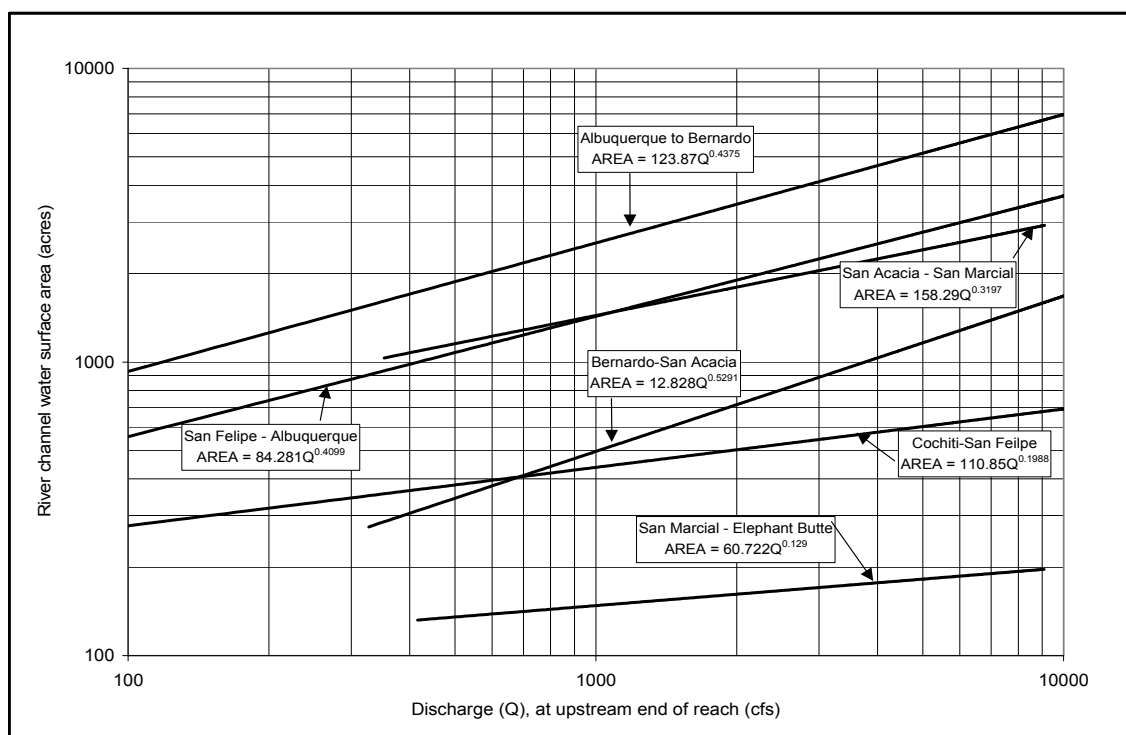
Graph 93. Travel time versus discharge, Rio Grande above San Juan Pueblo to Otowi Bridge (based on gage above San Juan Pueblo).



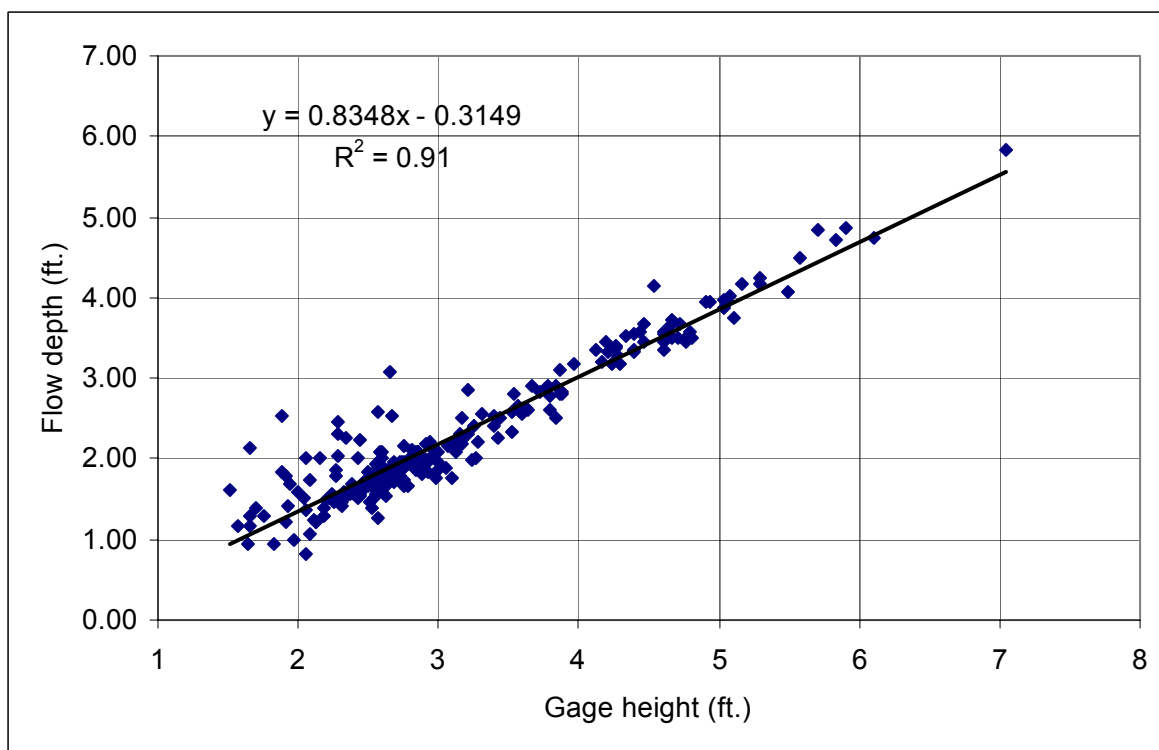
Graph 94. Travel time versus discharge, Rio Grande above San Juan Pueblo to Otowi Bridge (based on gage at Otowi Bridge).



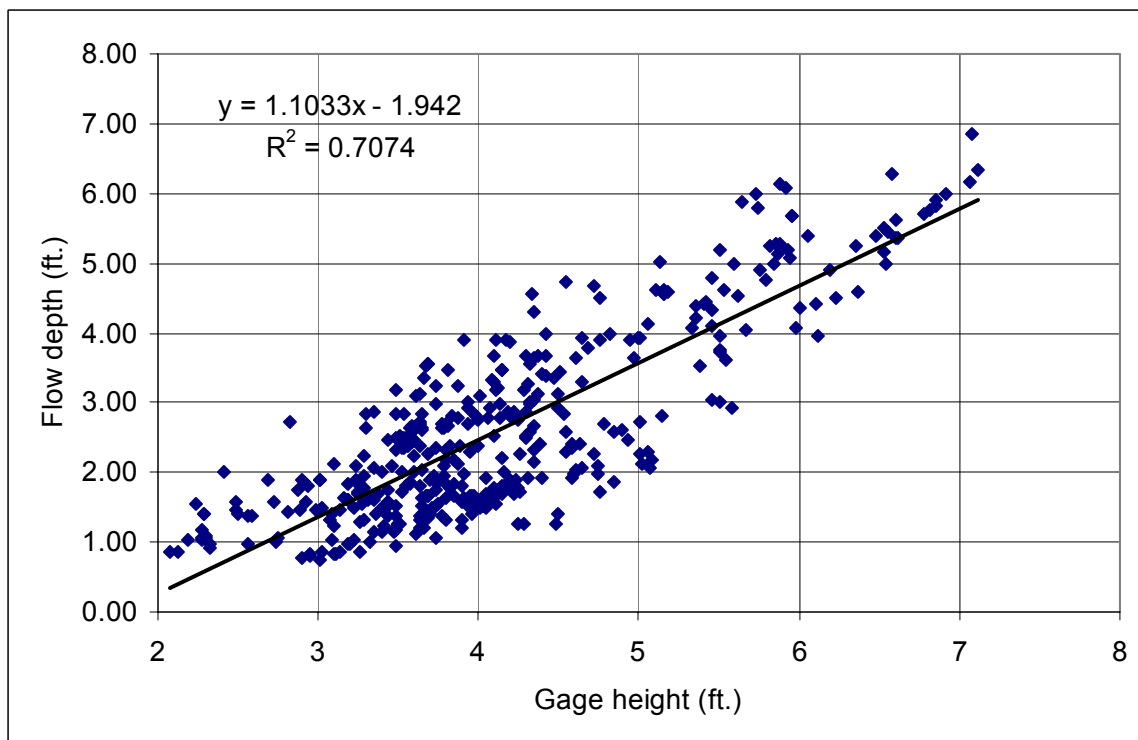
Graph 95. Travel time versus discharge, Rio Grande at Otowi Bridge to below Cochiti Dam (based on gage at Otowi Bridge).



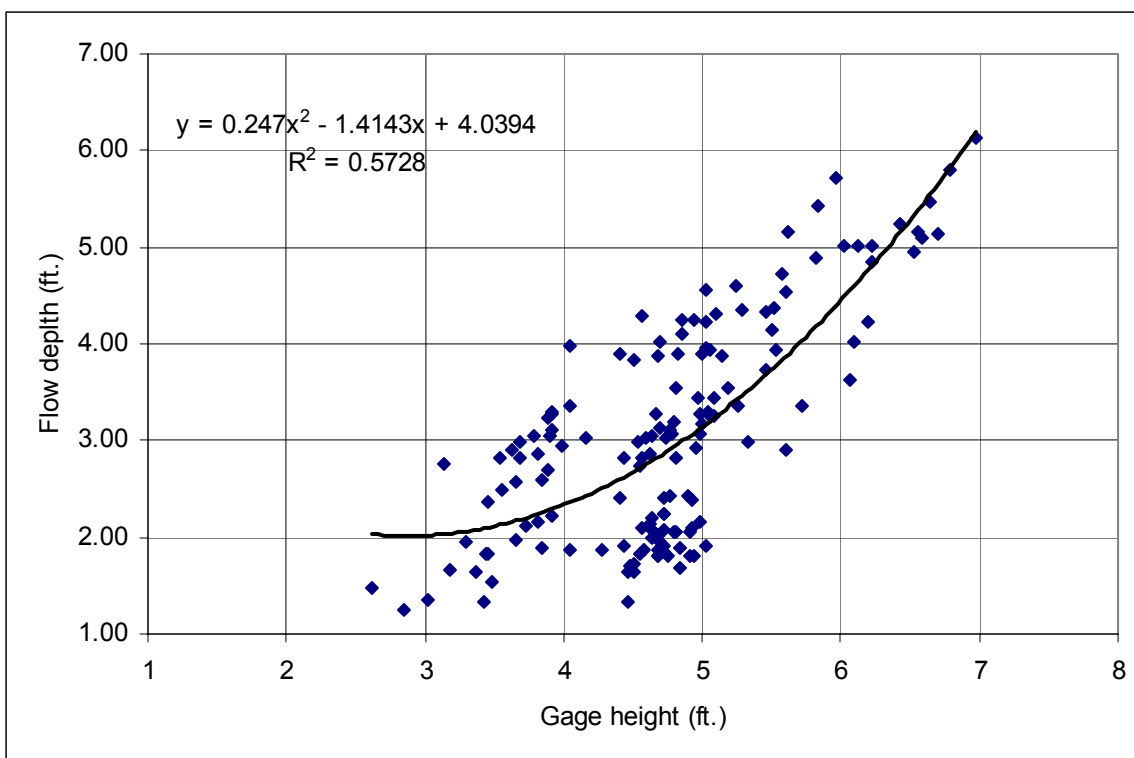
Graph 96. River-channel water surface area versus discharge, by reach, Rio Grande below Cochiti Dam to Elephant Butte Reservoir.



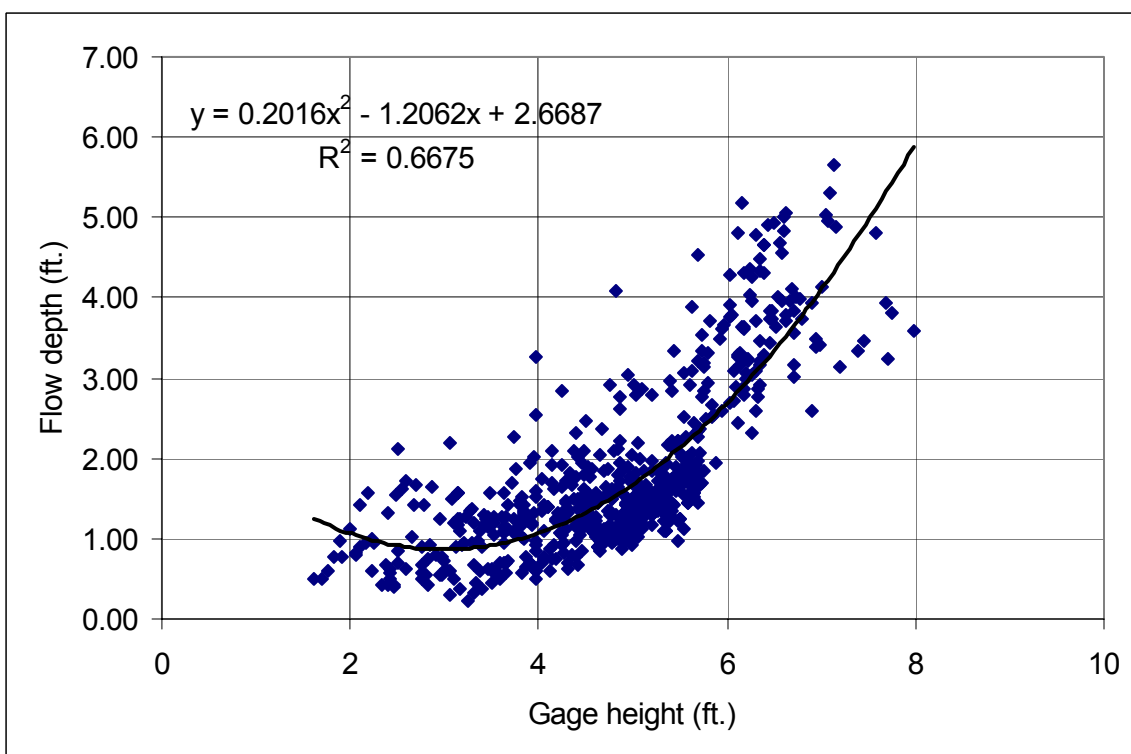
Graph 97. Measured average depth versus gage height, Rio Grande below Cochiti Dam, 1980-96.



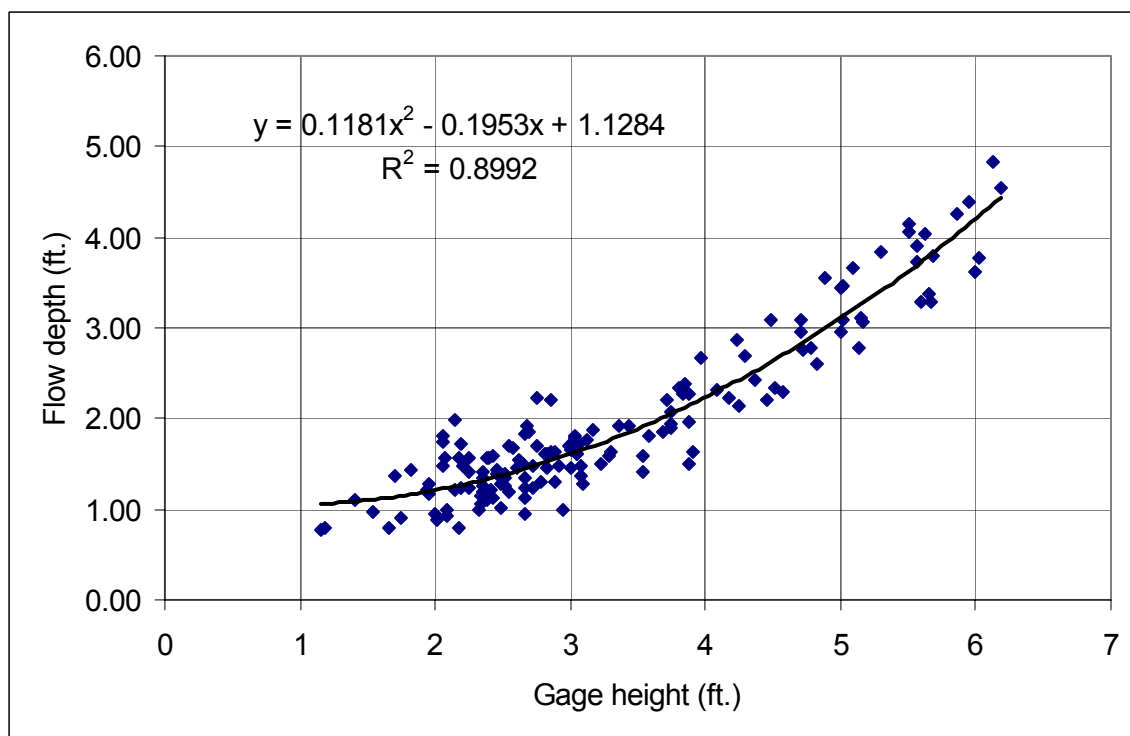
Graph 98. Measured average depth versus gage height, Rio Grande at San Felipe, September 1970 to December 1986.



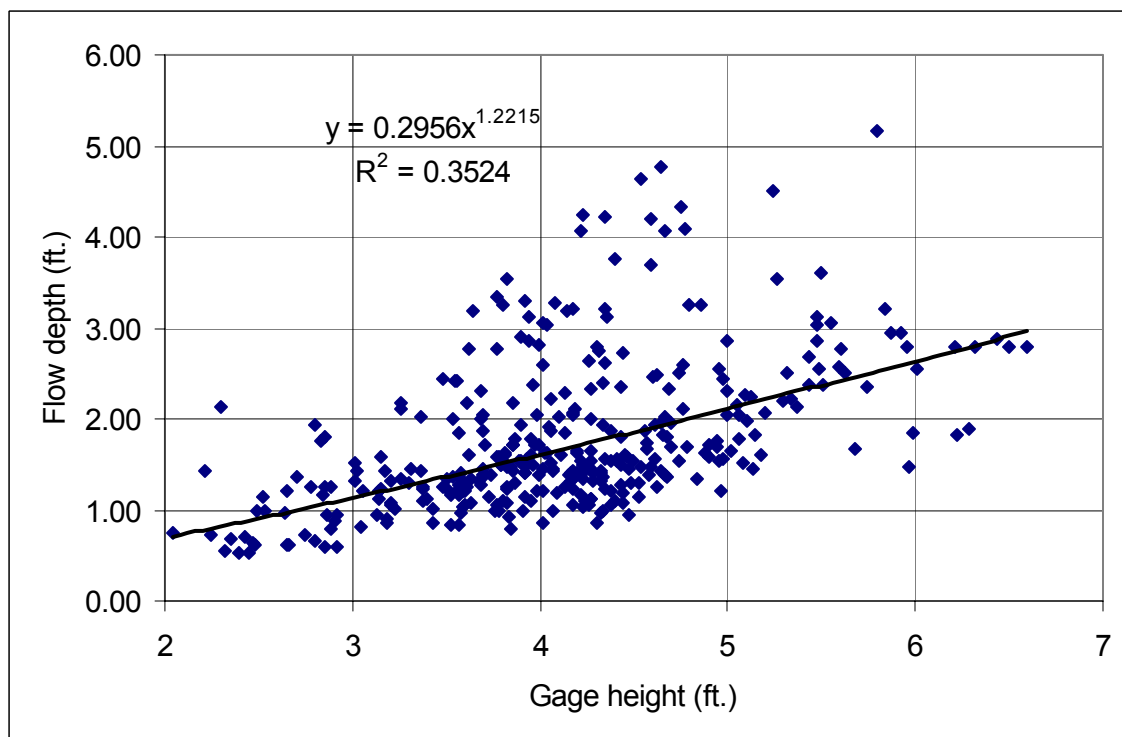
Graph 99. Measured average depth versus gage height, Rio Grande at San Felipe, January 1997 to June 1999.



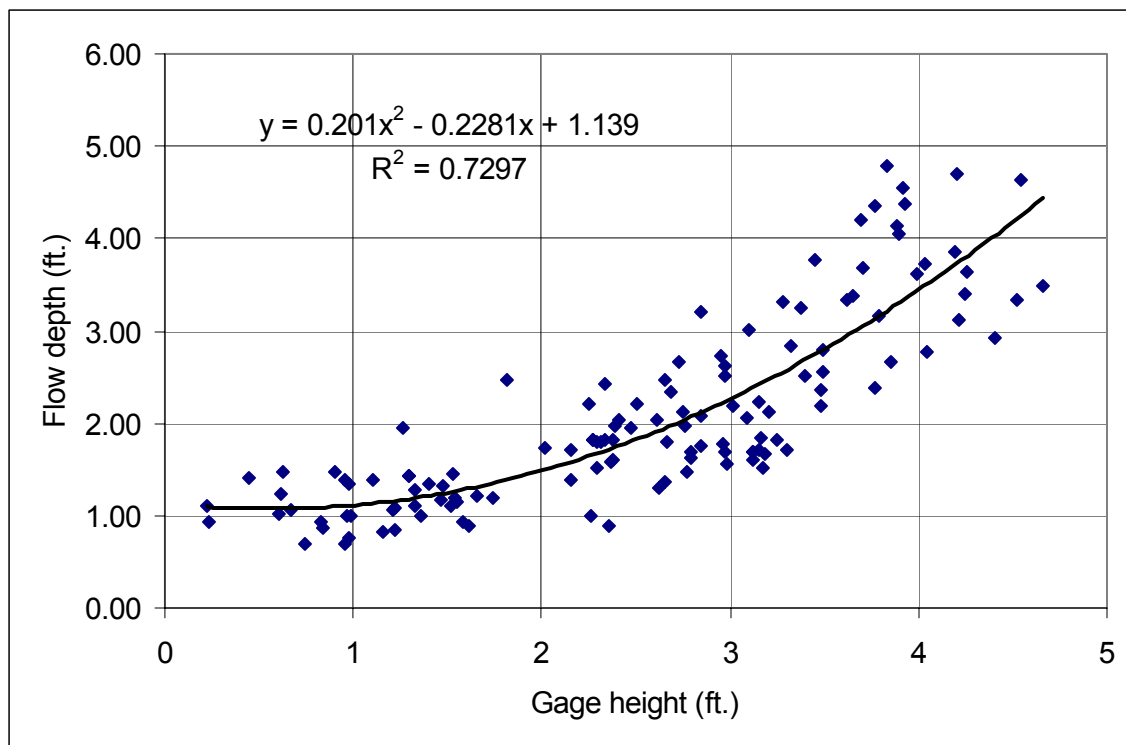
Graph 100. Measured average depth versus gage height, Rio Grande at Albuquerque, February 1970 to December 1986.



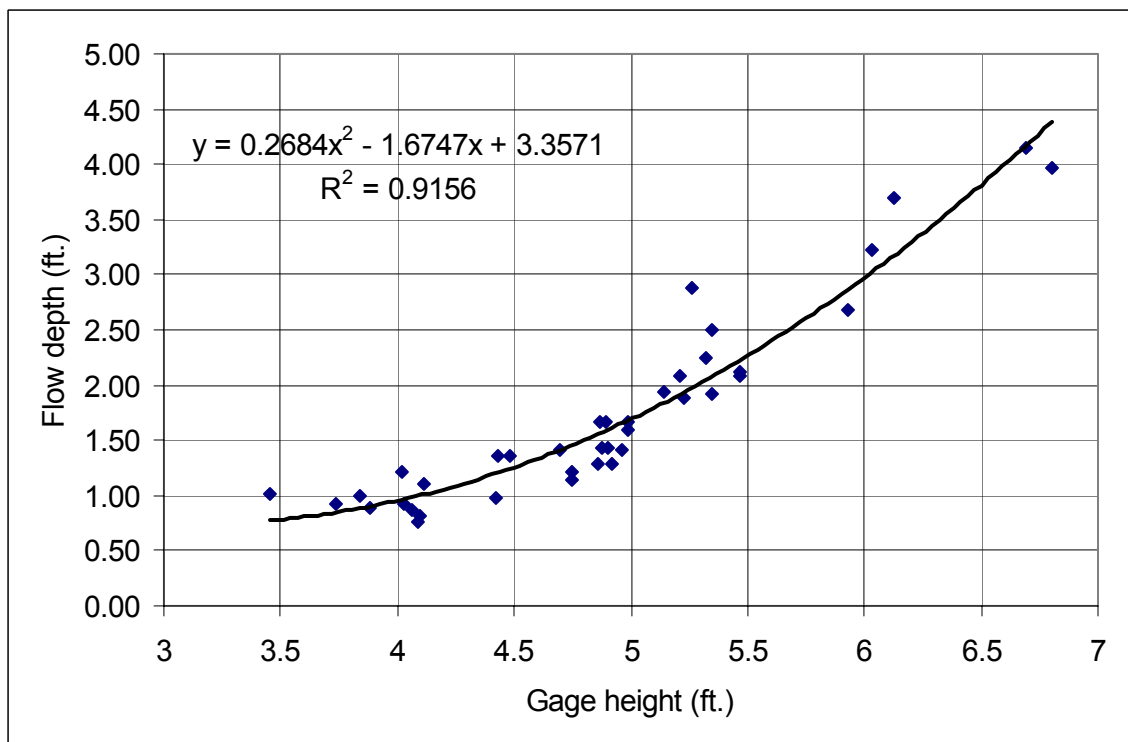
Graph 101. Measured average depth versus gage height, Rio Grande at Albuquerque, January 1987 to September 1998.



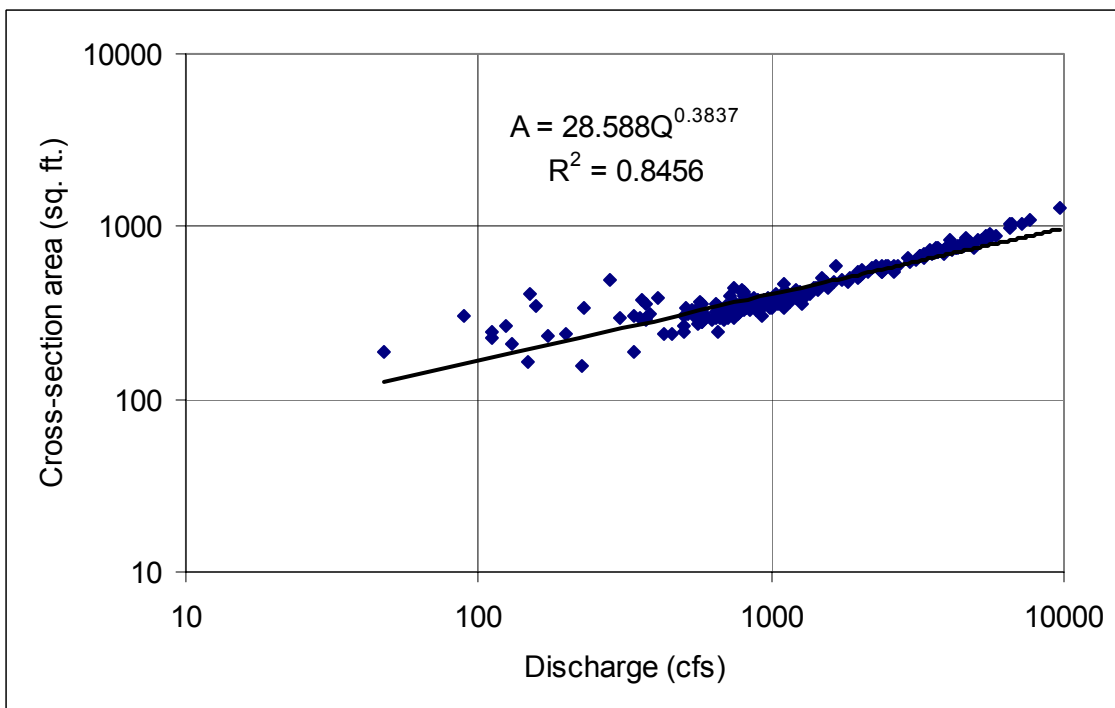
Graph 102. Measured average depth versus gage height, Rio Grande Floodway near Bernardo, June 1970 to July 1987.



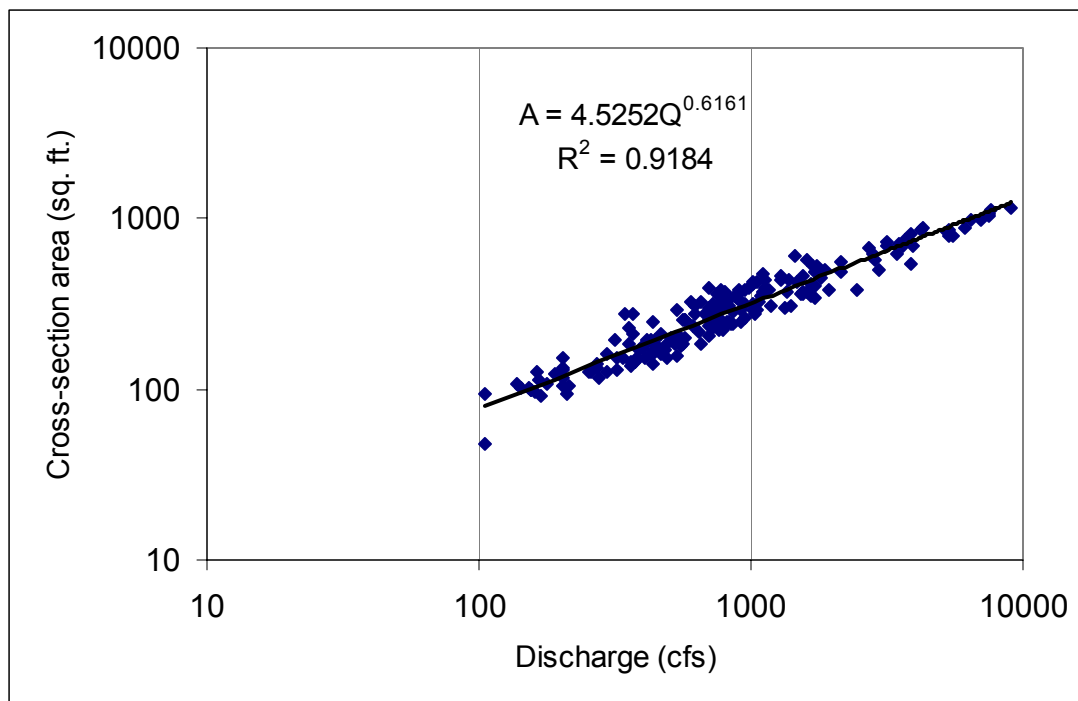
Graph 103. Measured average depth versus gage height, Rio Grande Floodway near Bernardo, July 1987 to May 1996.



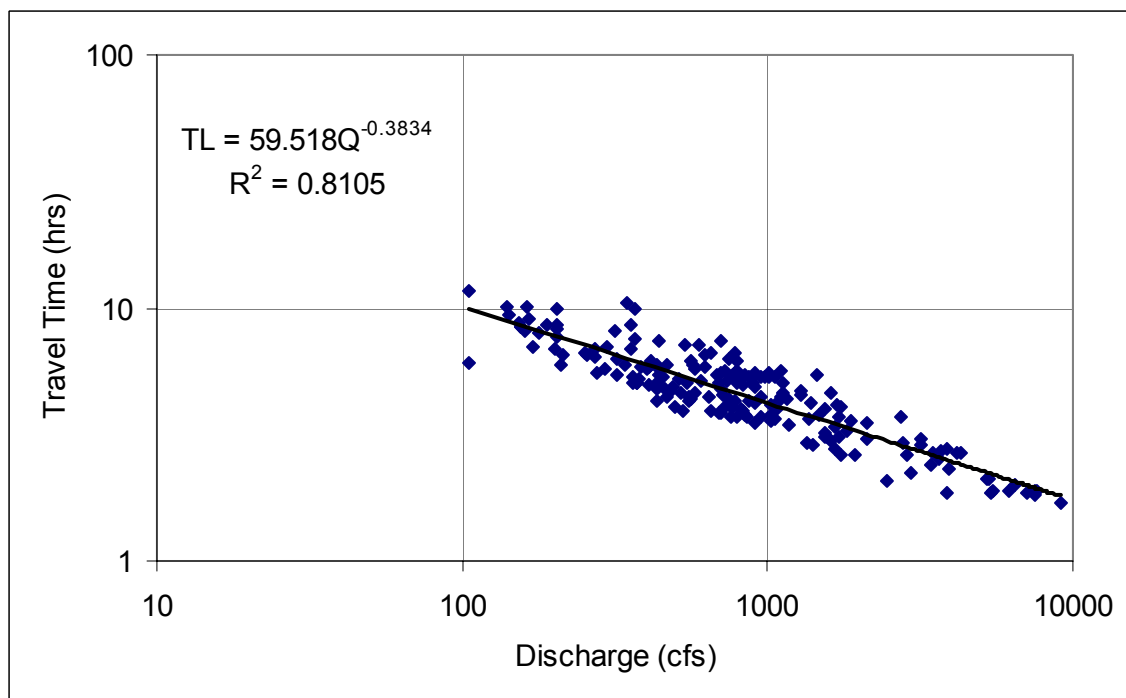
Graph 104. Measured average depth versus gage height, Rio Grande Floodway near Bernardo, May 1996 to July 1998.



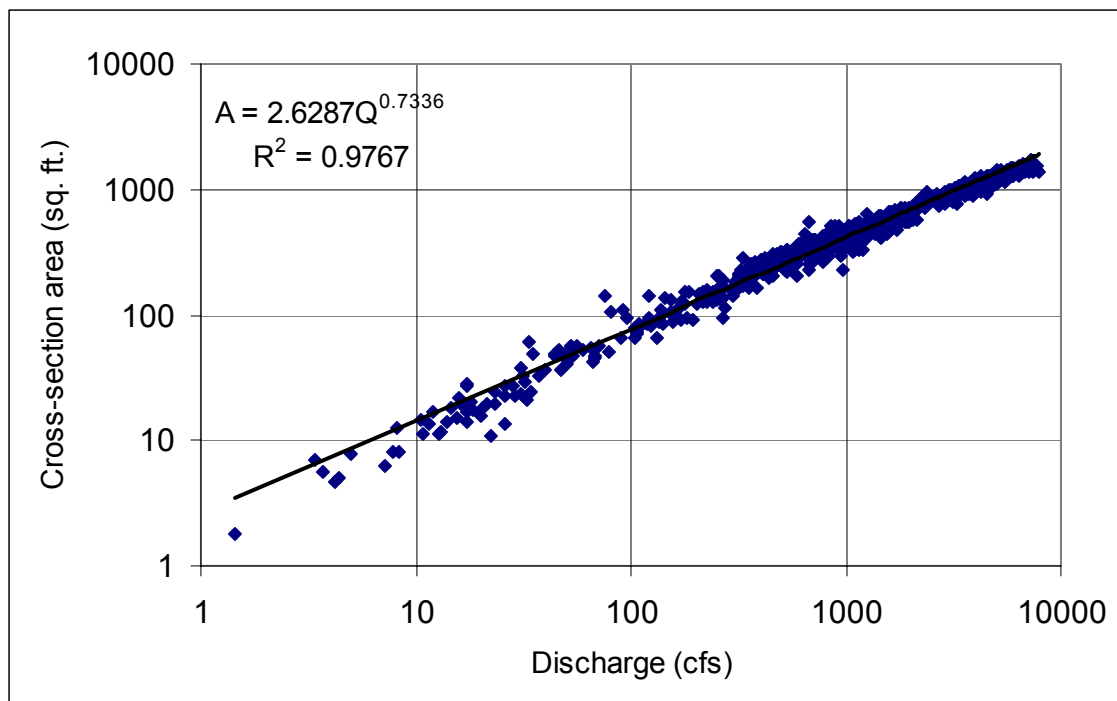
Graph 105. Cross section area versus discharge, Rio Grande below Cochiti Dam.



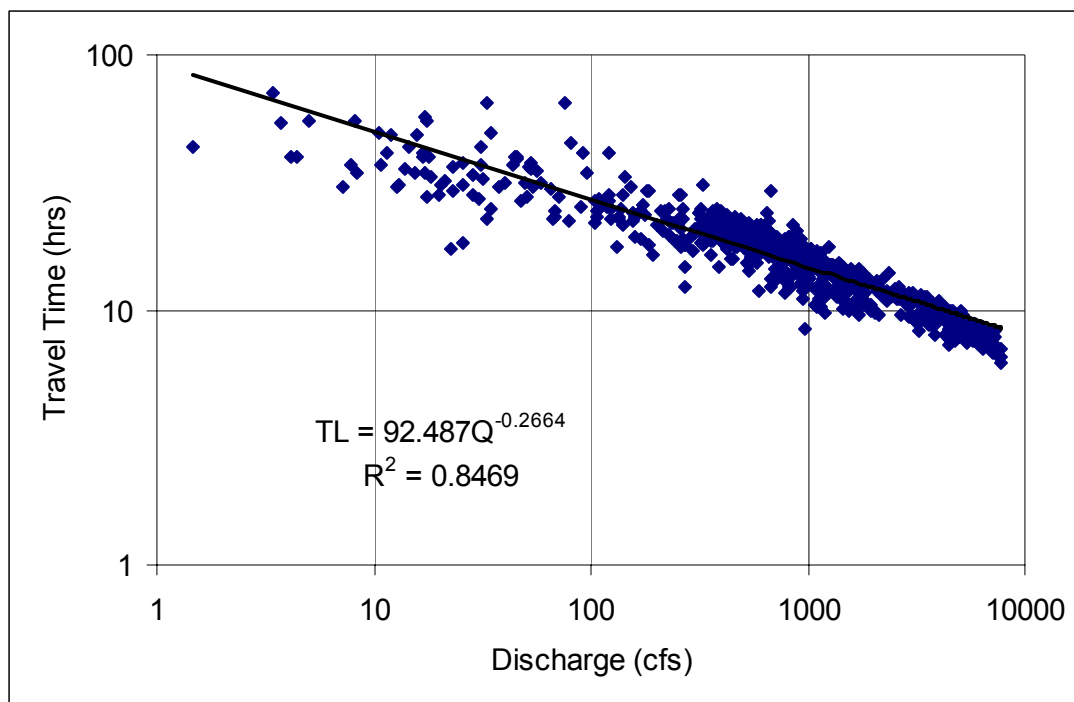
Graph 106. Cross section area versus discharge, Rio Grande at San Felipe.



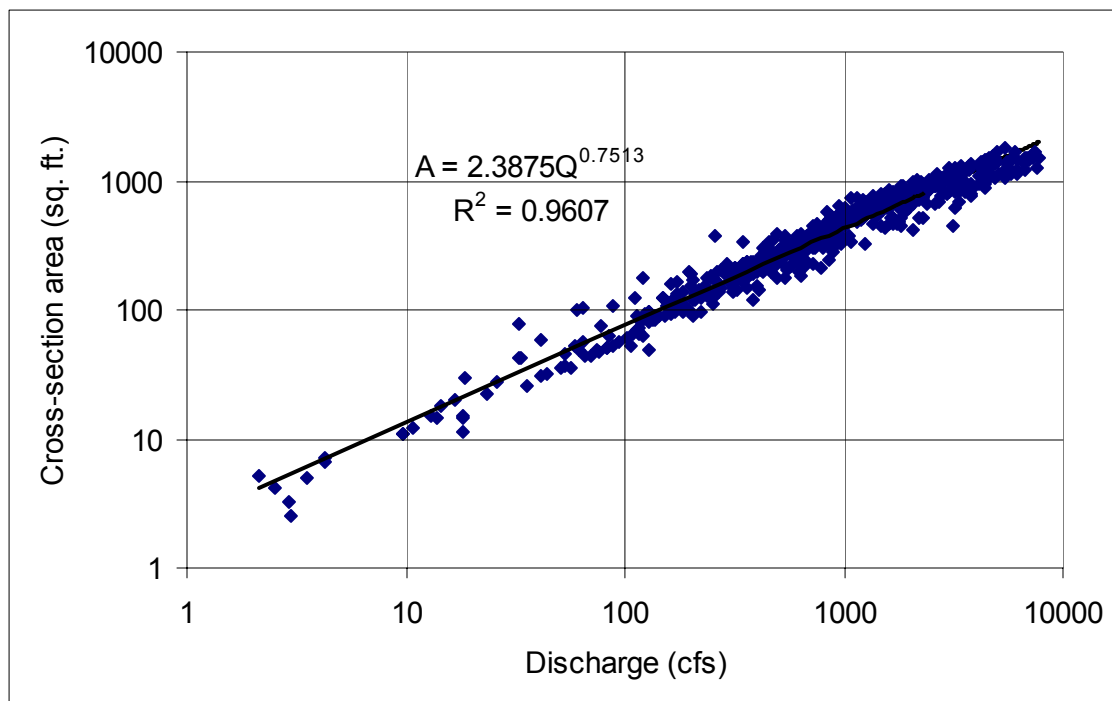
Graph 107. Travel time versus discharge, Rio Grande below Cochiti Dam to San Felipe (based on gage at San Felipe).



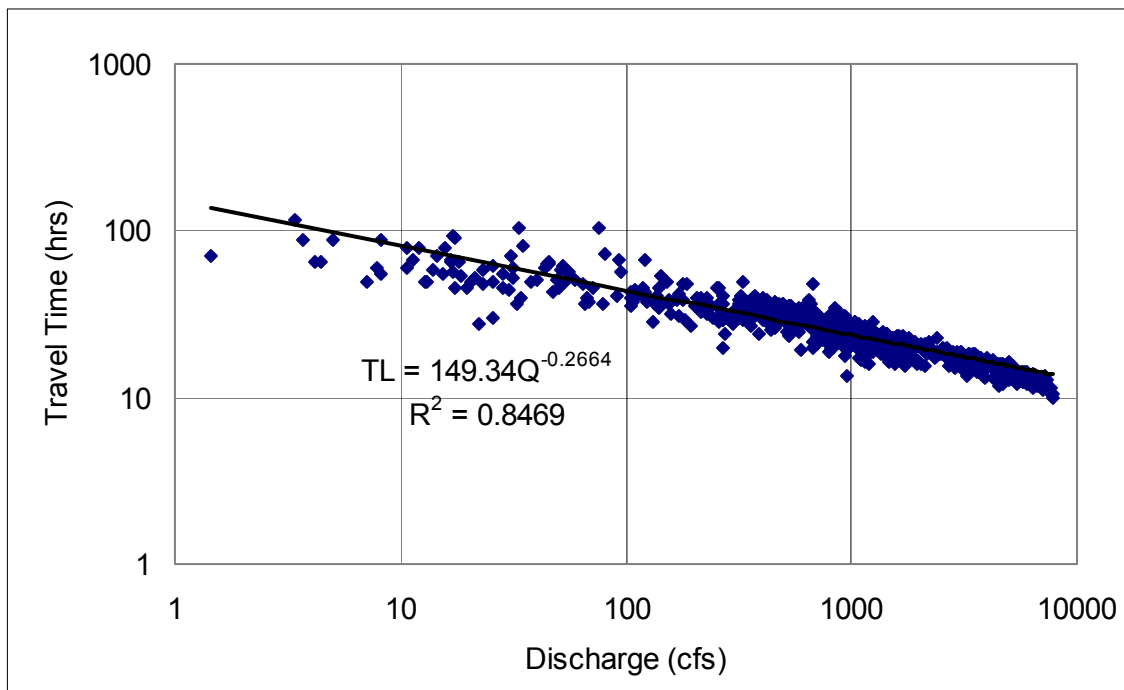
Graph 108. Cross section area versus discharge, Rio Grande at Albuquerque.



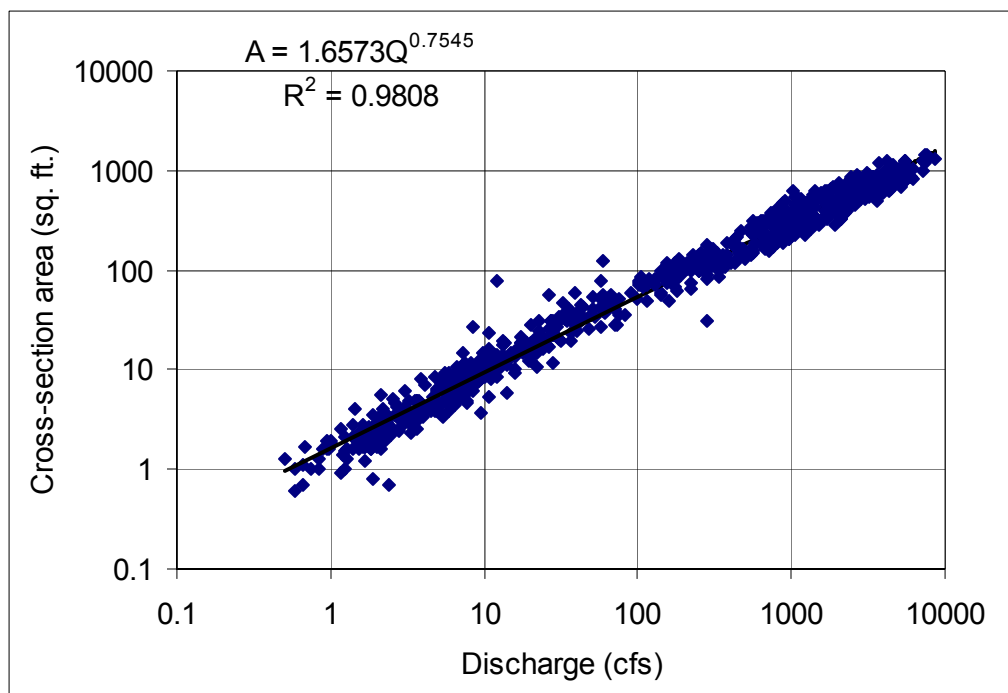
Graph 109. Travel time versus discharge, Rio Grande at San Felipe to Albuquerque (based on gage at Albuquerque).



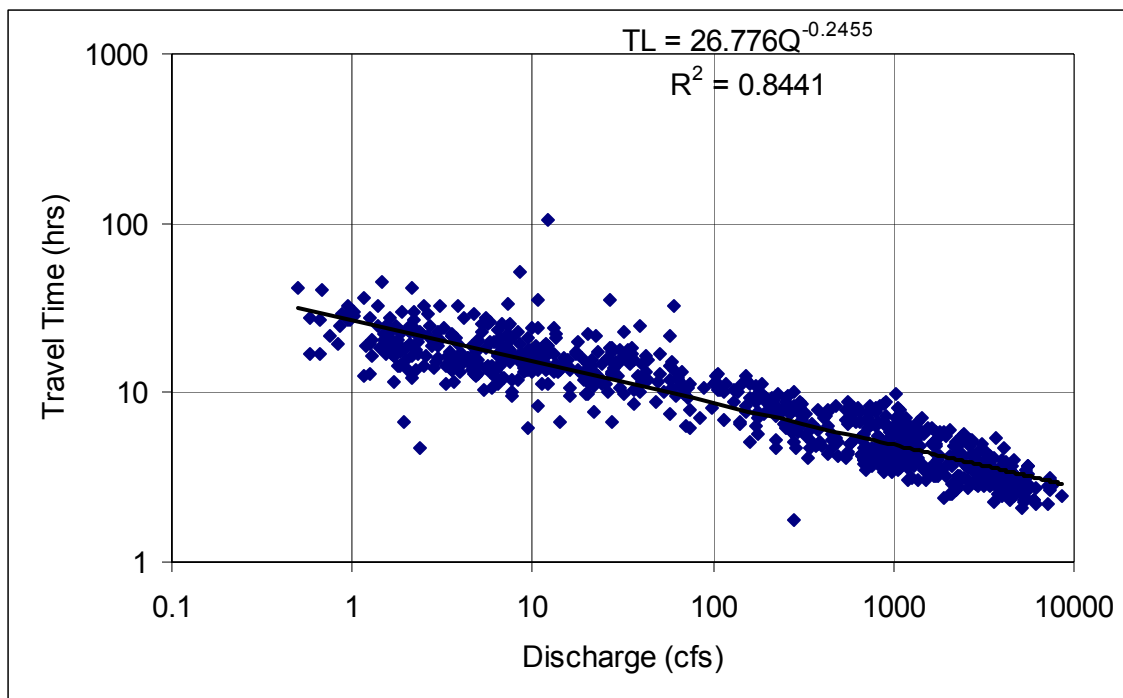
Graph 110. Cross section area versus discharge, Rio Grande Floodway near Bernardo.



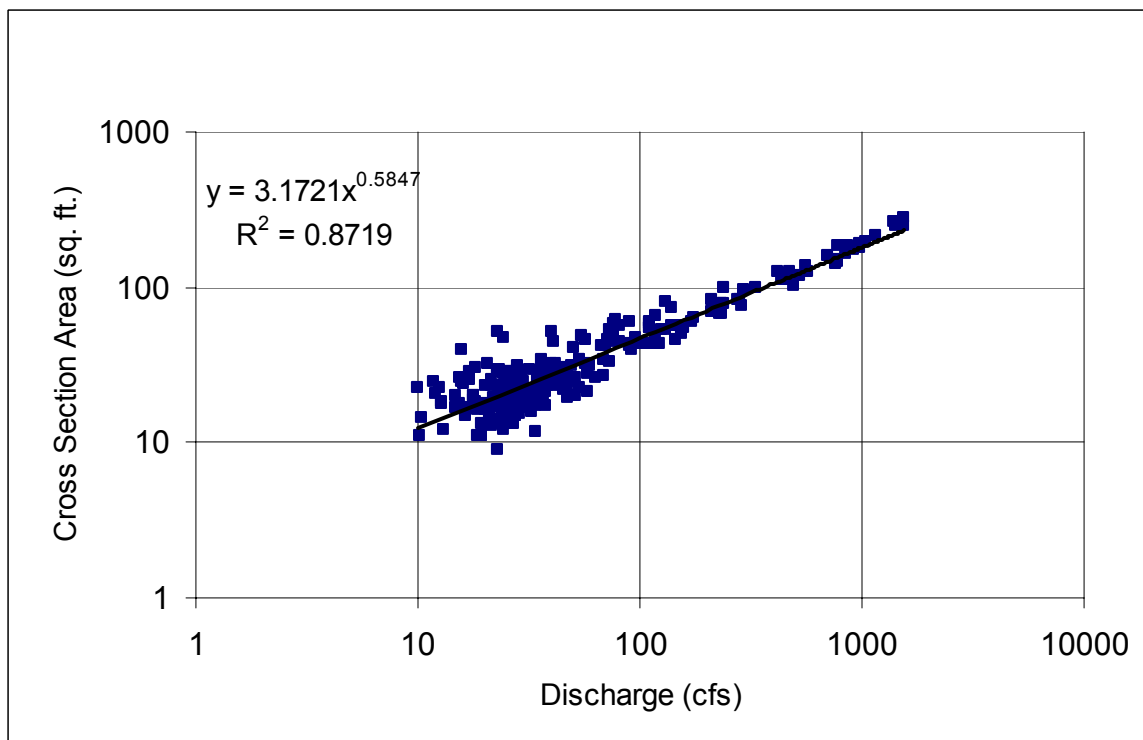
Graph 111. Travel time versus discharge, Rio Grande at Albuquerque to Floodway at Bernardo (based on gage at Albuquerque).



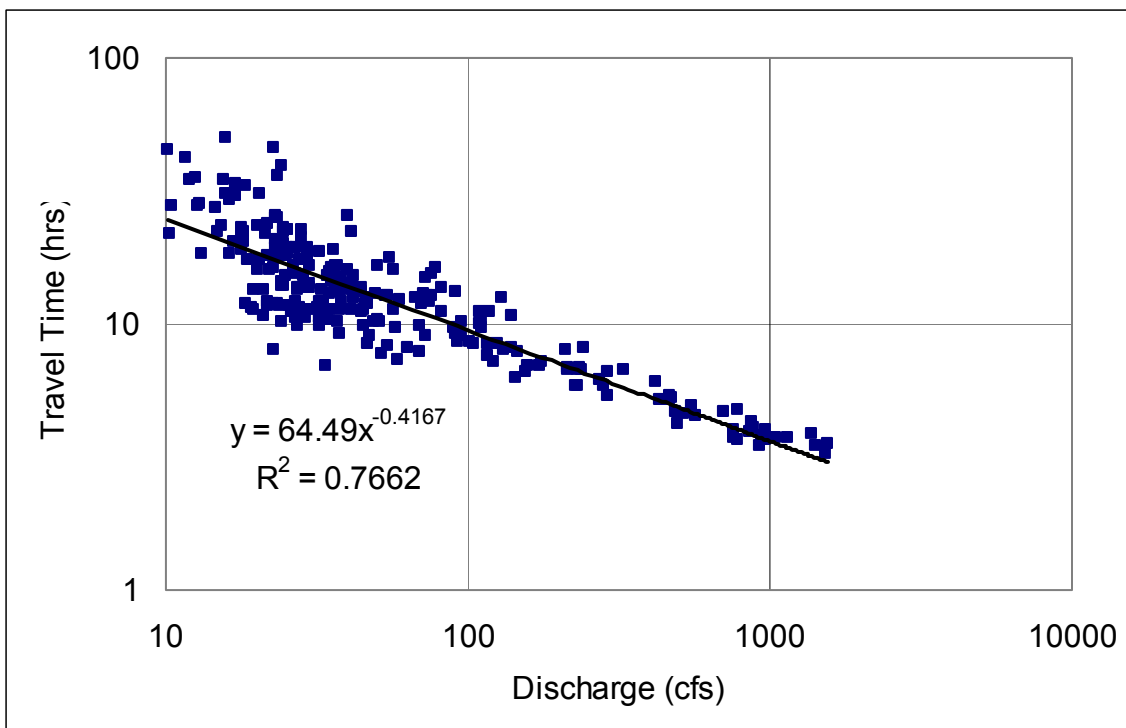
Graph 112. Cross section area versus discharge, Rio Grande Floodway at San Acacia.



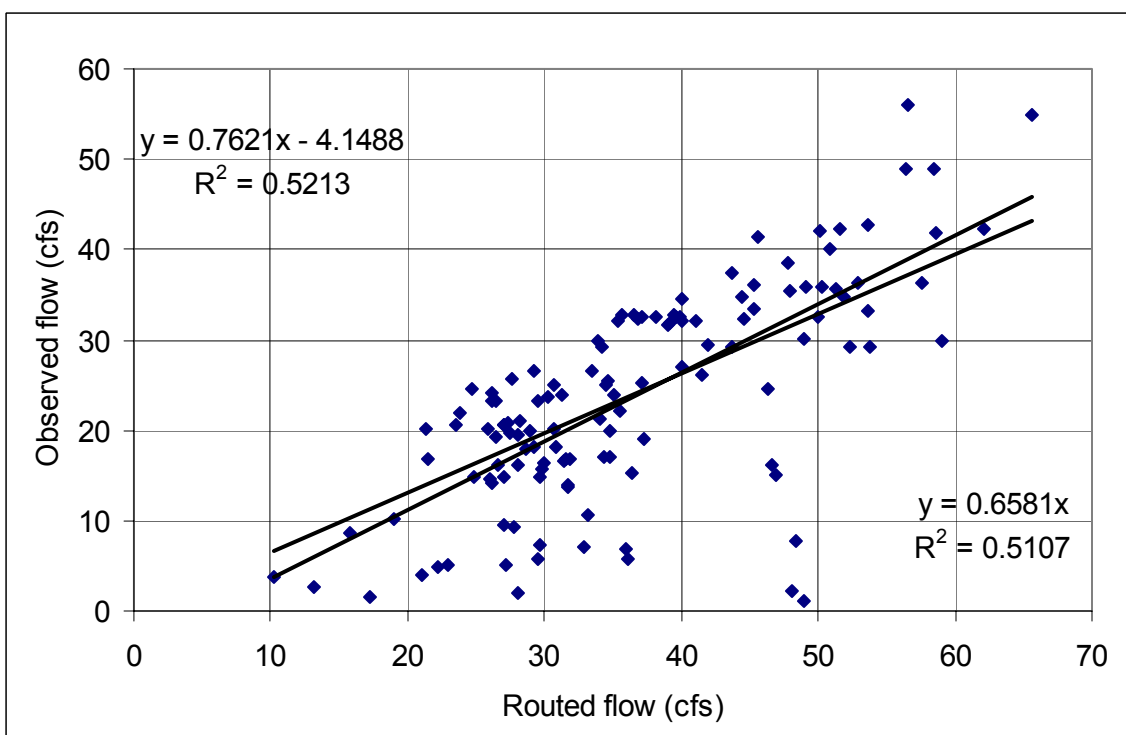
Graph 113. Travel time versus discharge, Rio Grande Floodway near Bernardo to Floodway at San Acacia (based on gage Floodway at San Acacia).



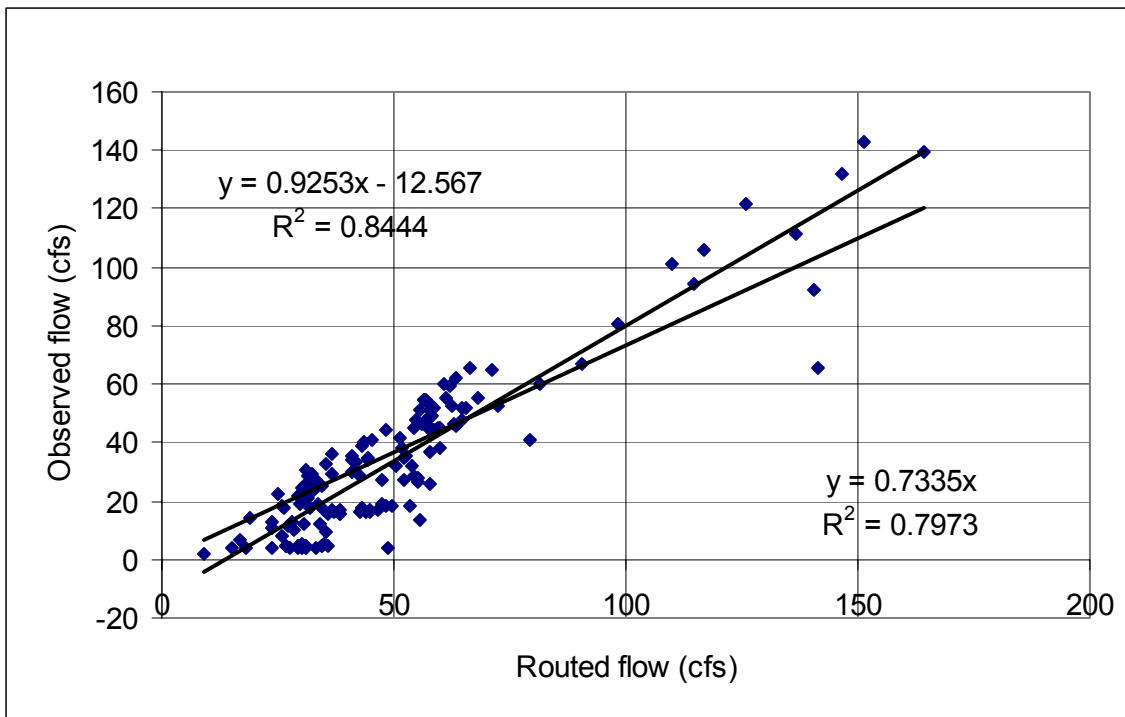
Graph 114. Cross section area versus discharge, Jemez River near Jemez.



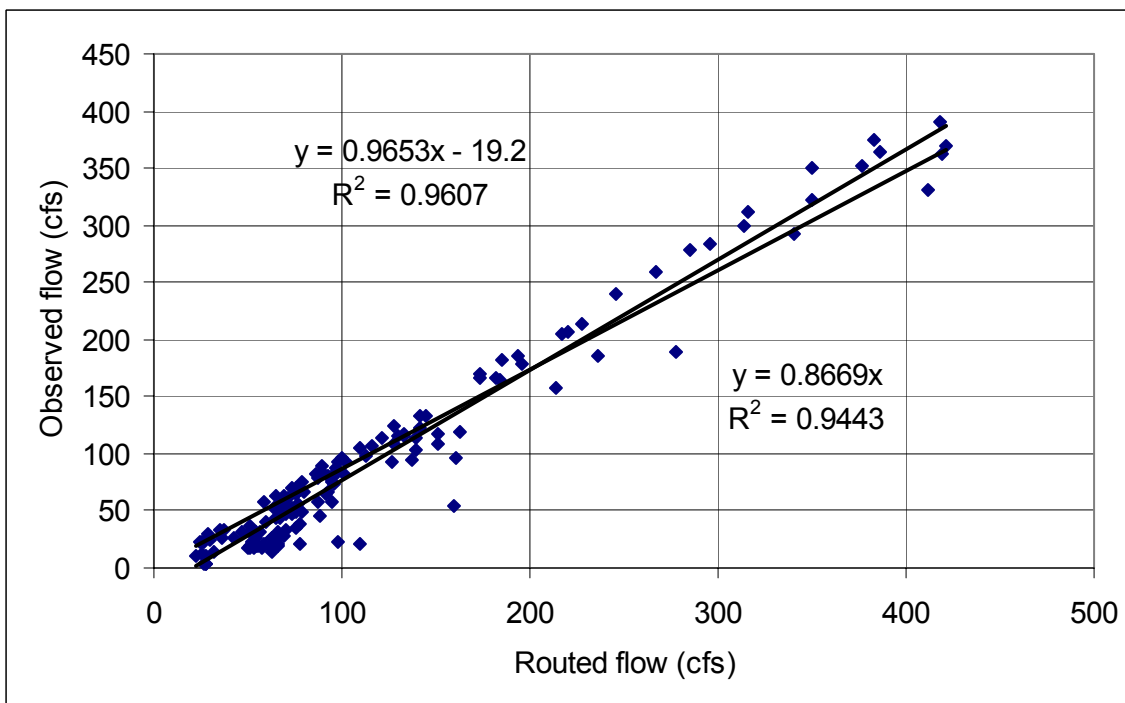
Graph 115. Travel time versus discharge, Jemez River near Jemez to Jemez Canyon Reservoir (based on gage near Jemez).



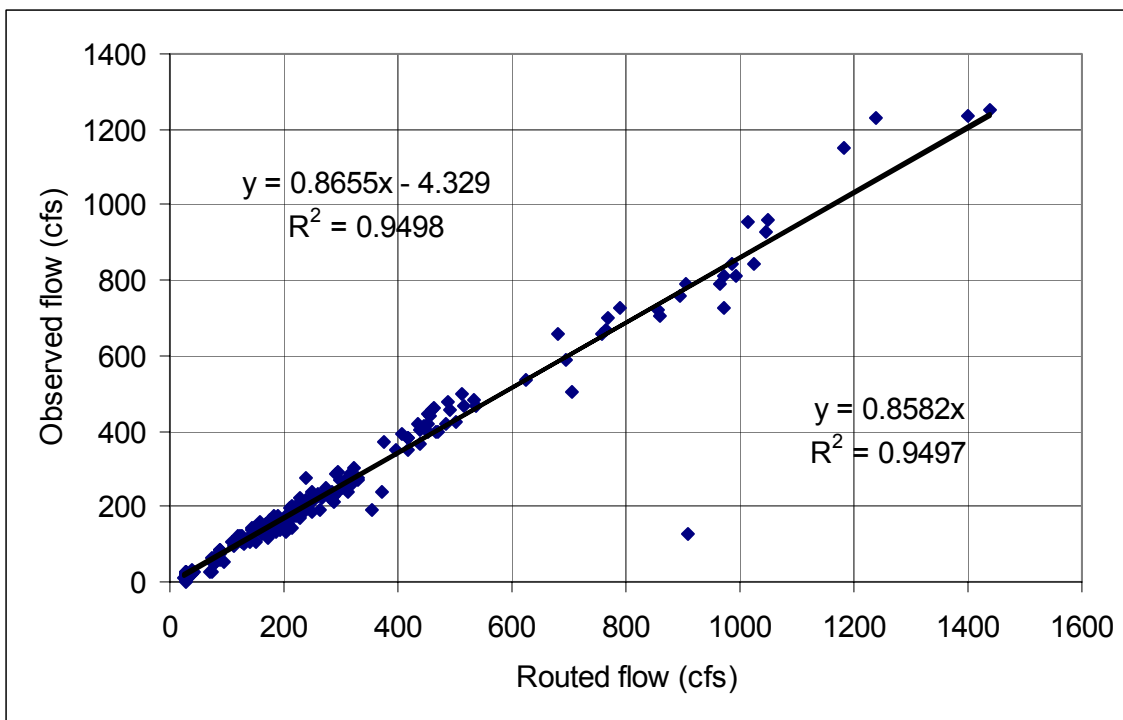
Graph 116. Observed flow versus routed flow, filtered for losses, Jemez River near Jemez to Jemez Canyon Reservoir, January 1985-96.



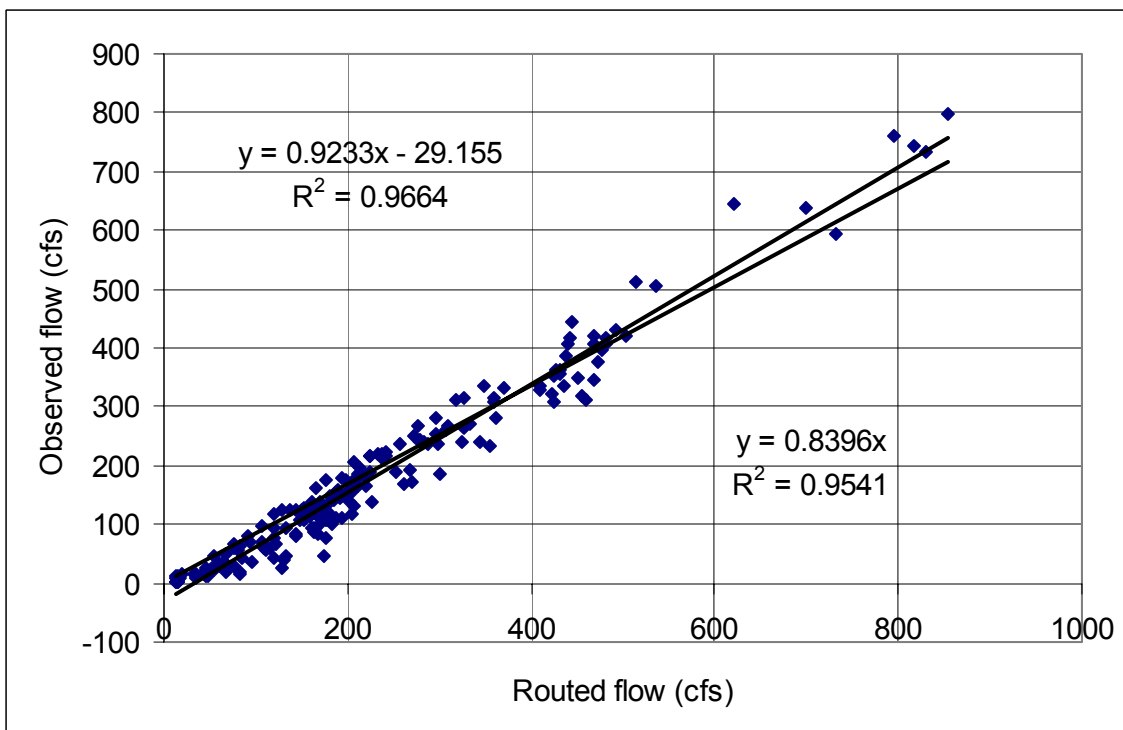
Graph 117. Observed flow versus routed flow, filtered for losses, Jemez River near Jemez to Jemez Canyon Reservoir, February 1985-96.



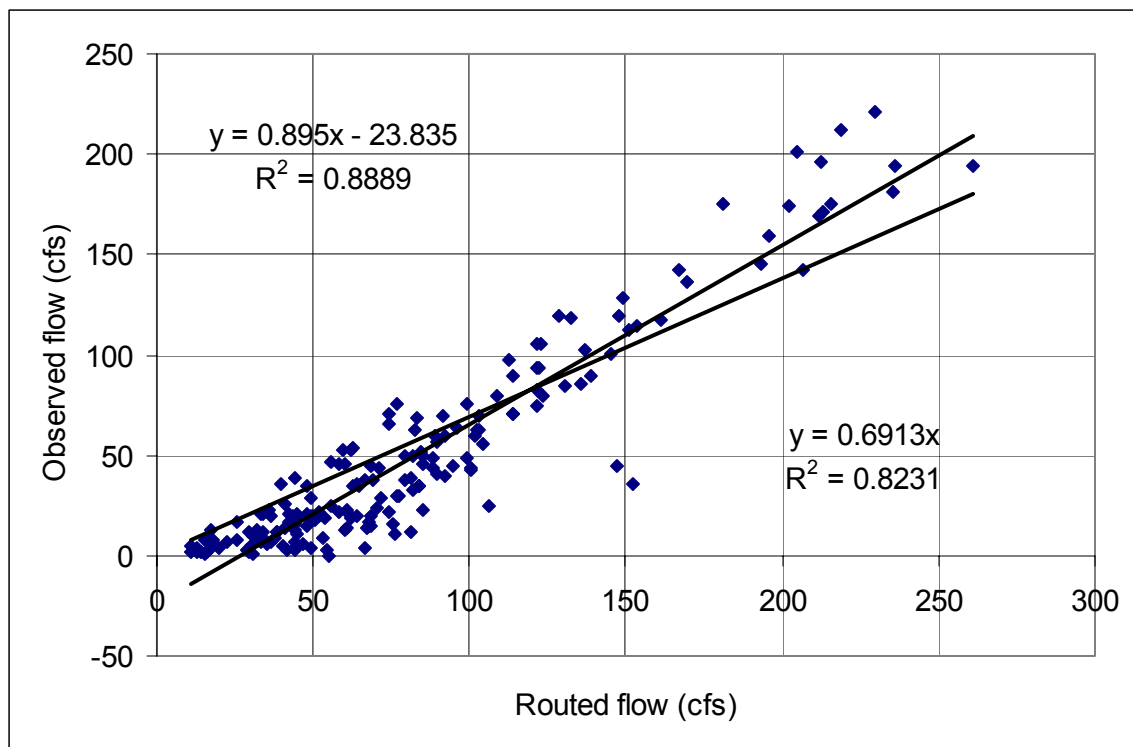
Graph 118. Observed flow versus routed flow, filtered for losses, Jemez River near Jemez to Jemez Canyon Reservoir, March 1985-96.



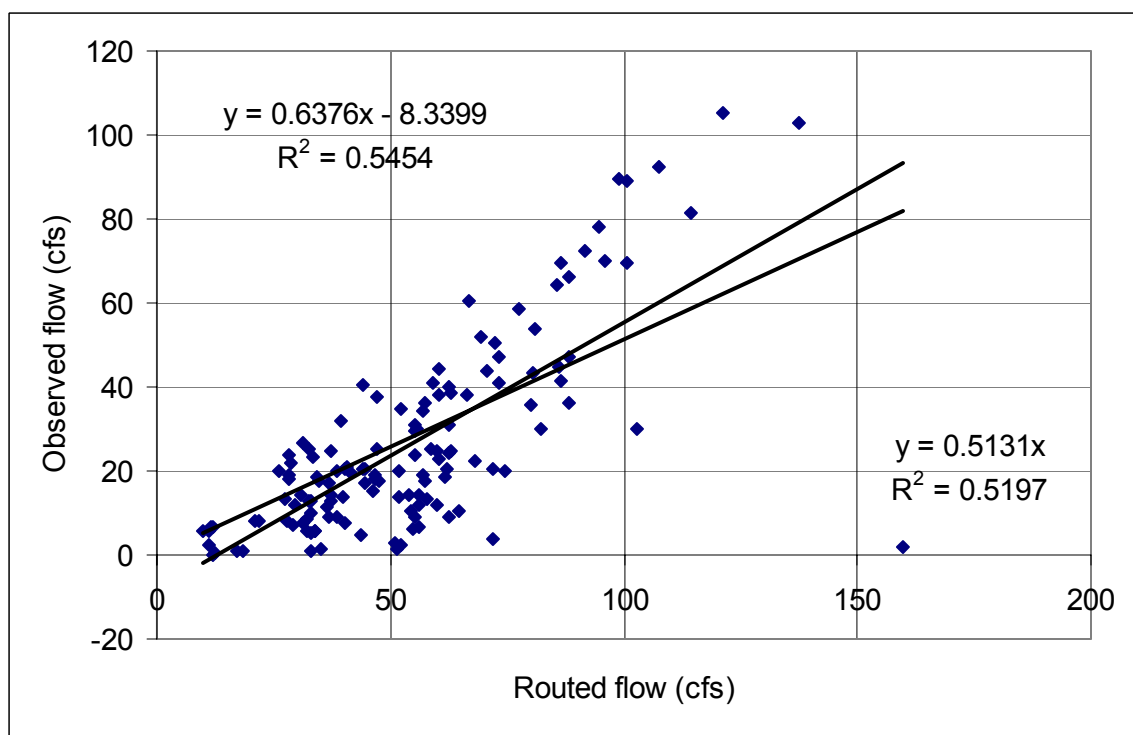
Graph 119. Observed flow versus routed flow, filtered for losses, Jemez River near Jemez to Jemez Canyon Reservoir, April 1985-96.



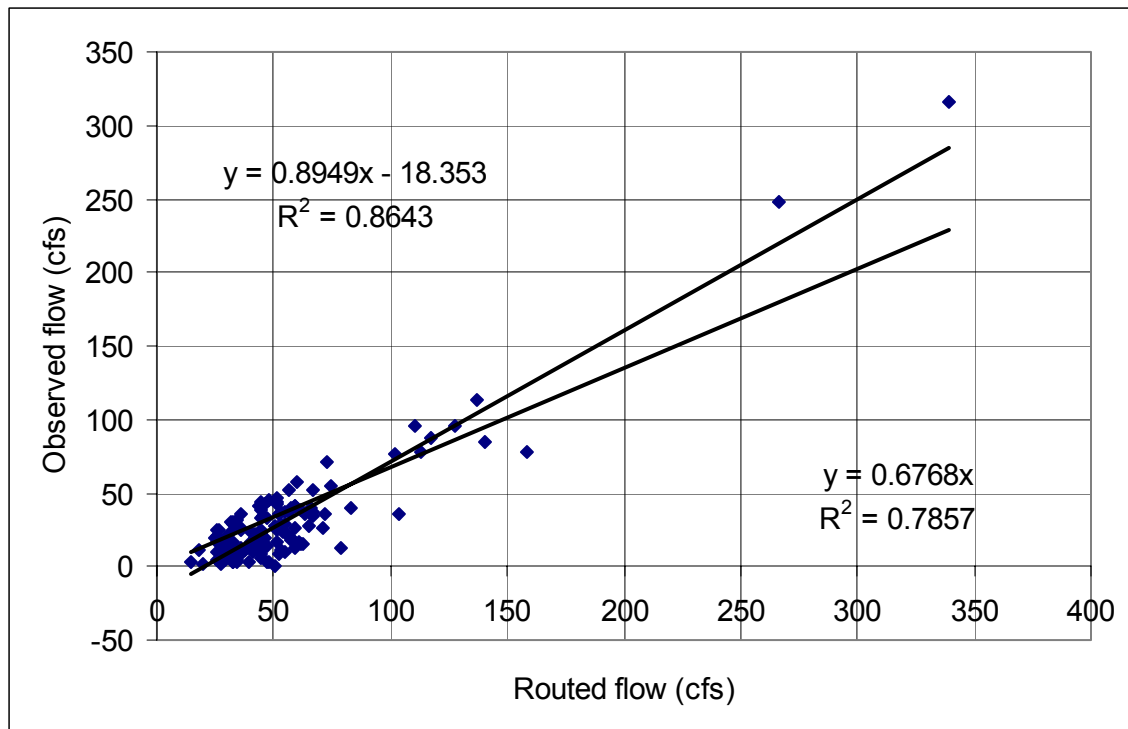
Graph 120. Observed flow versus routed flow, filtered for losses, Jemez River near Jemez to Jemez Canyon Reservoir, May 1985-96.



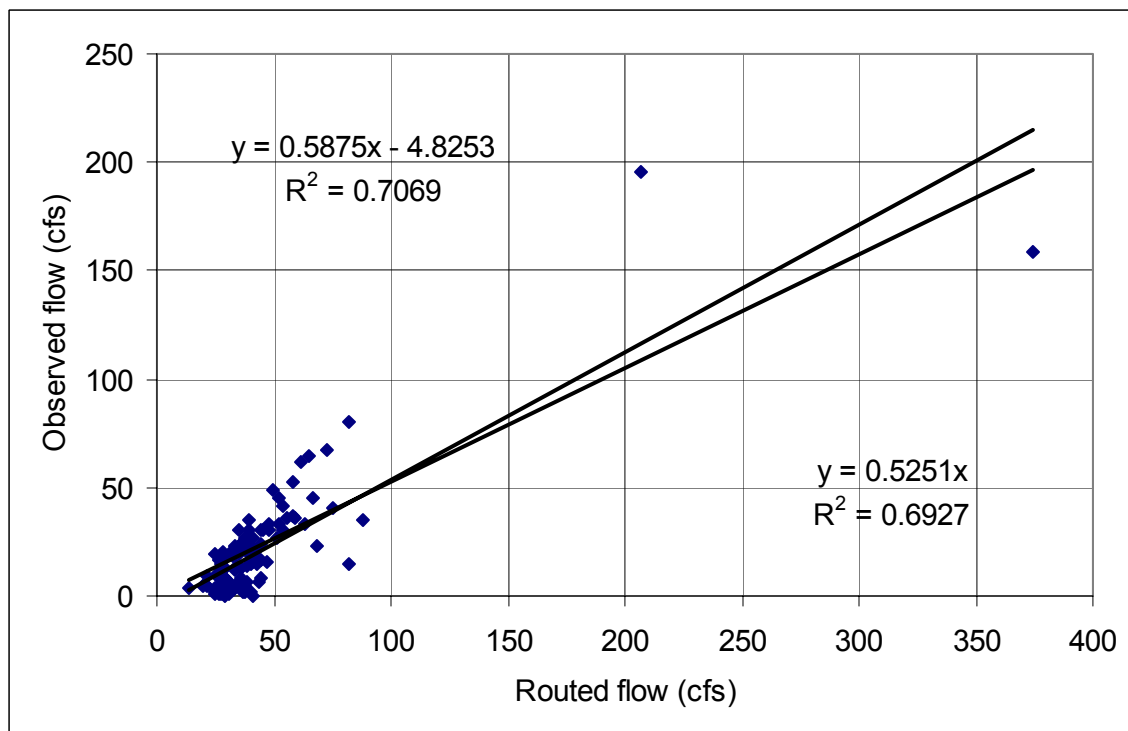
Graph 121. Observed flow versus routed flow, filtered for losses, Jemez River near Jemez to Jemez Canyon Reservoir, June 1985-96.



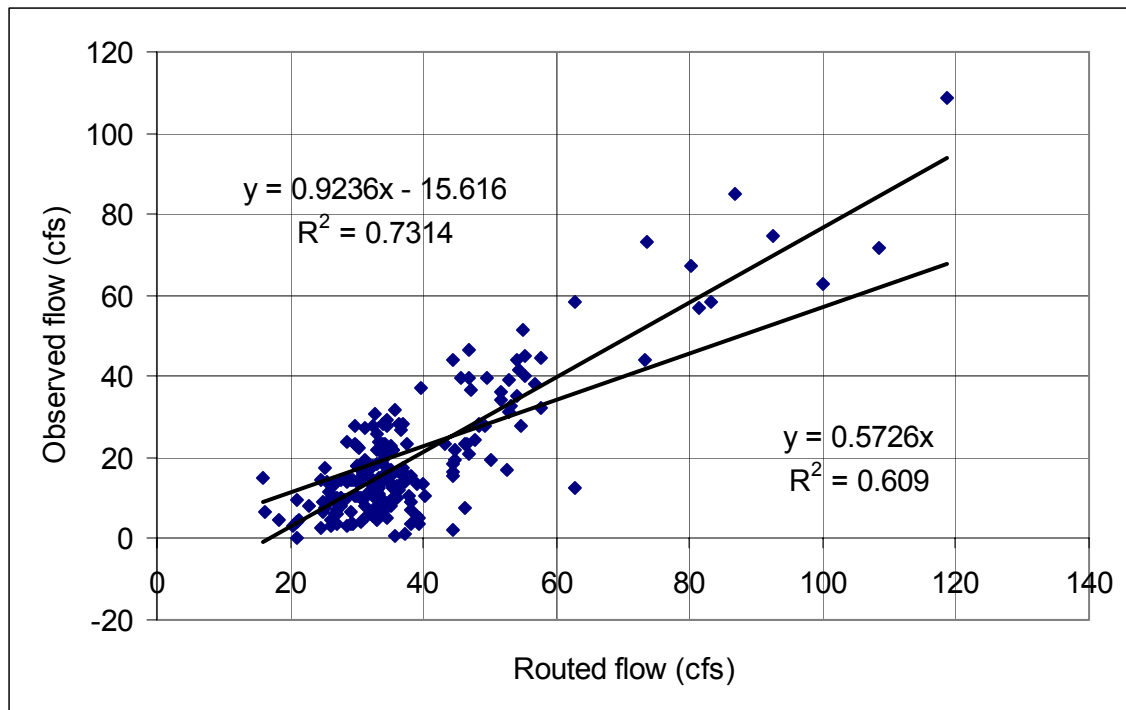
Graph 122. Observed flow versus routed flow, filtered for losses, Jemez River near Jemez to Jemez Canyon Reservoir, July 1985-96.



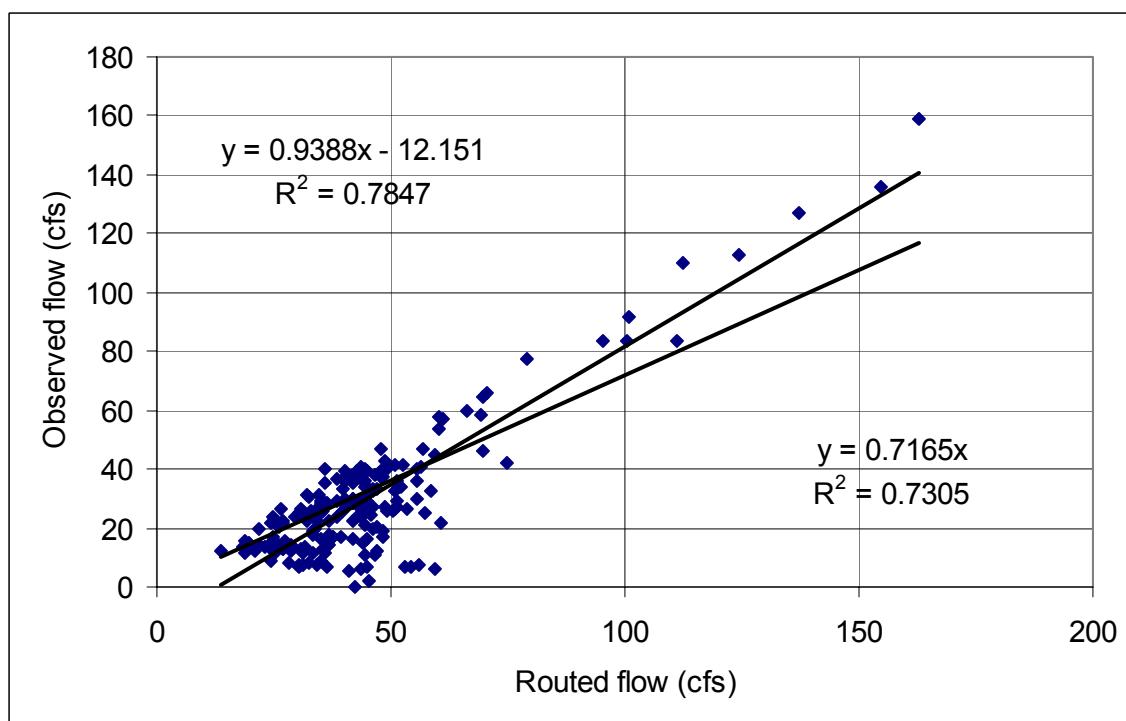
Graph 123. Observed flow versus routed flow, filtered for losses, Jemez River near Jemez to Jemez Canyon Reservoir, August 1985-96.



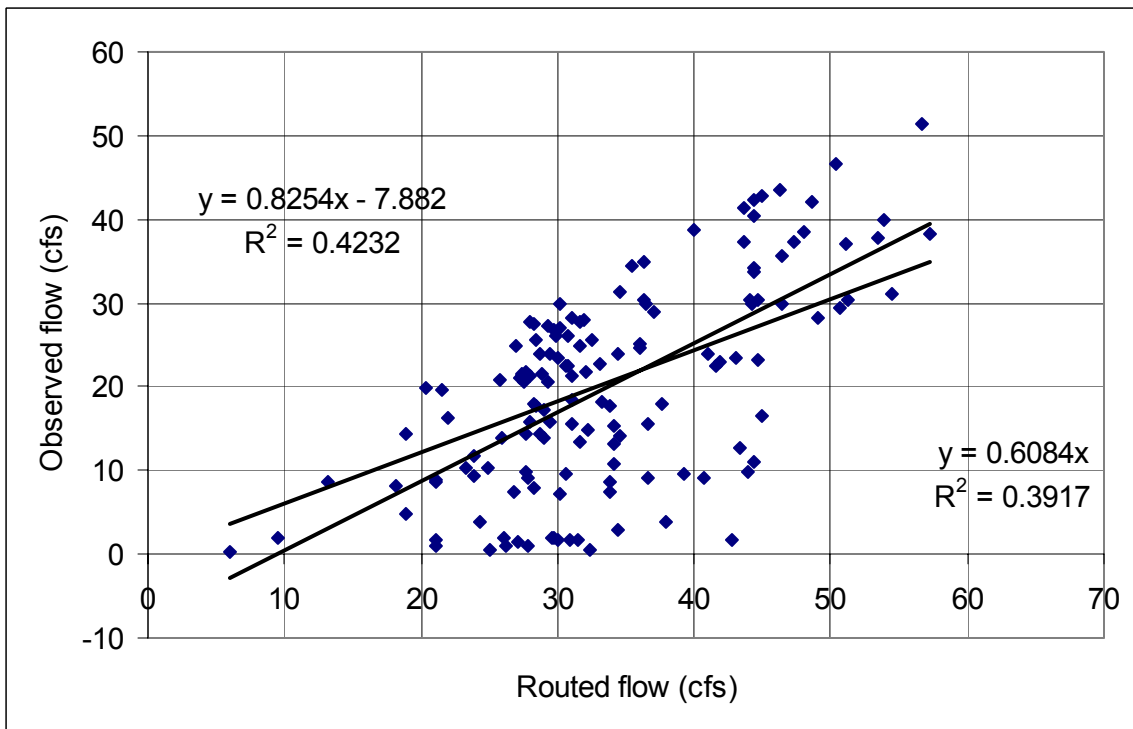
Graph 124. Observed flow versus routed flow, filtered for losses, Jemez River near Jemez to Jemez Canyon Reservoir, September 1985-96.



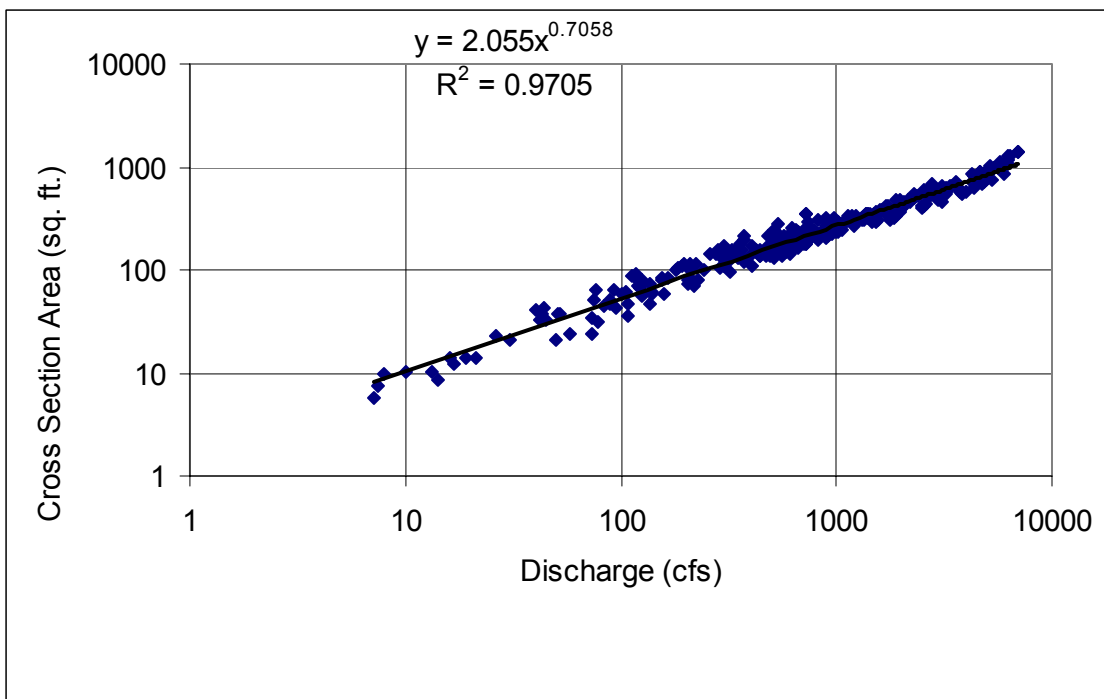
Graph 125. Observed flow versus routed flow, filtered for losses, Jemez River near Jemez to Jemez Canyon Reservoir, October 1985-96.



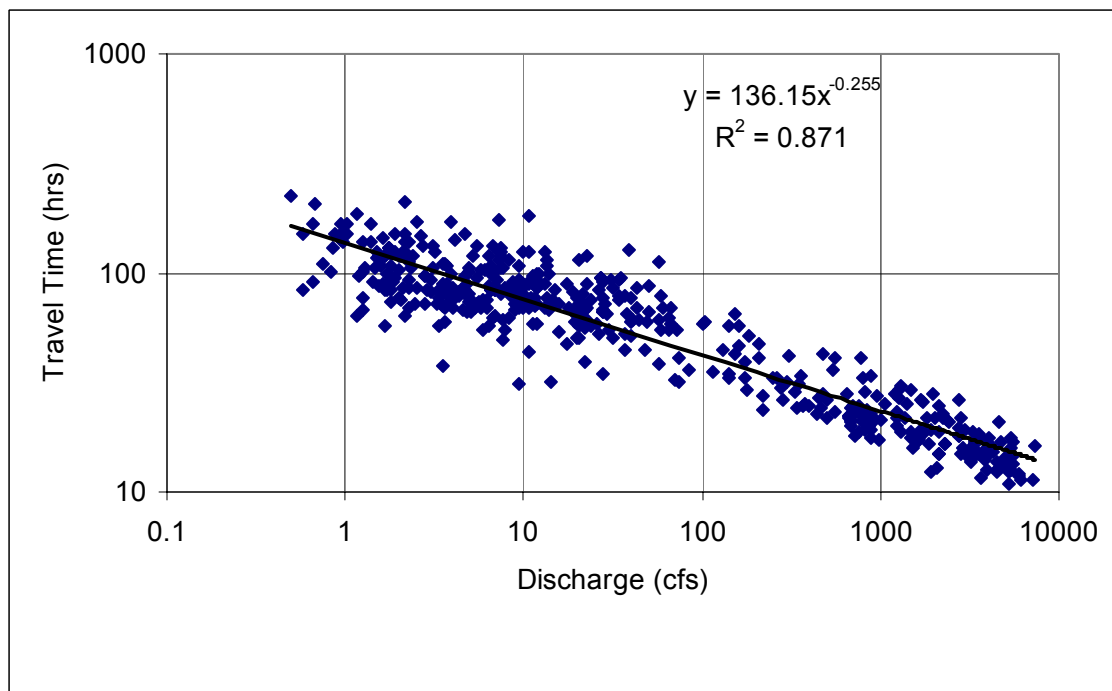
Graph 126. Observed flow versus routed flow, filtered for losses, Jemez River near Jemez to Jemez Canyon Reservoir, November 1985-96.



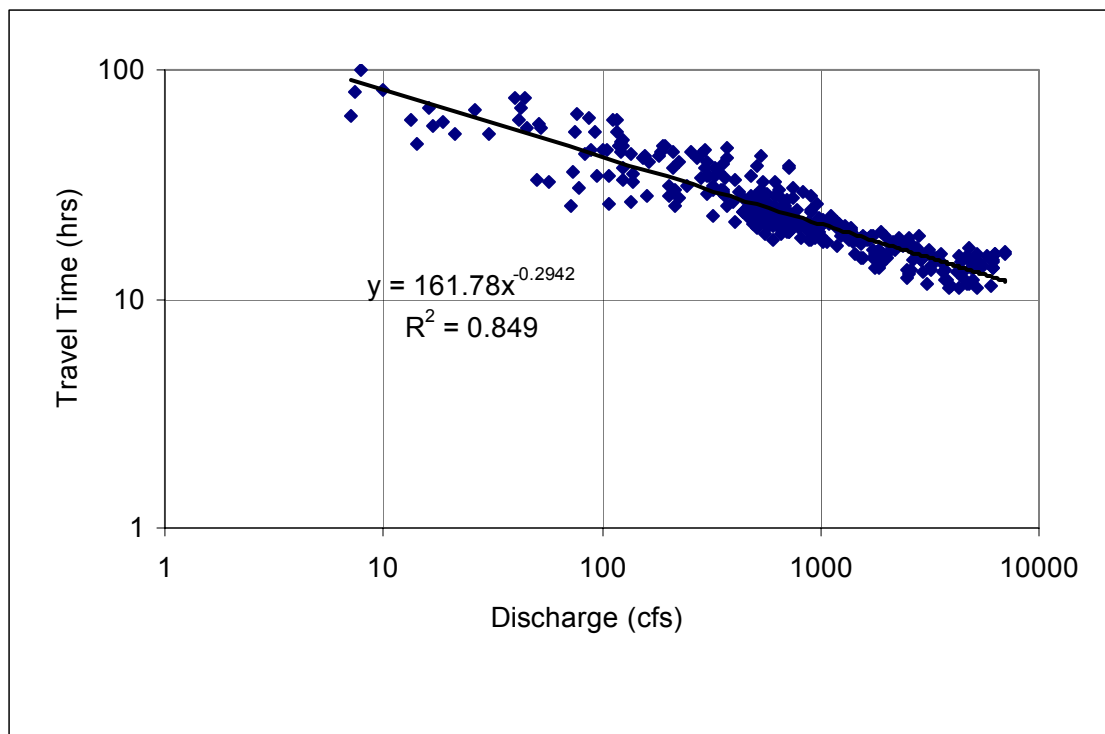
Graph 127. Observed flow versus routed flow, filtered for losses, Jemez River near Jemez to Jemez Canyon Reservoir, December 1985-96.



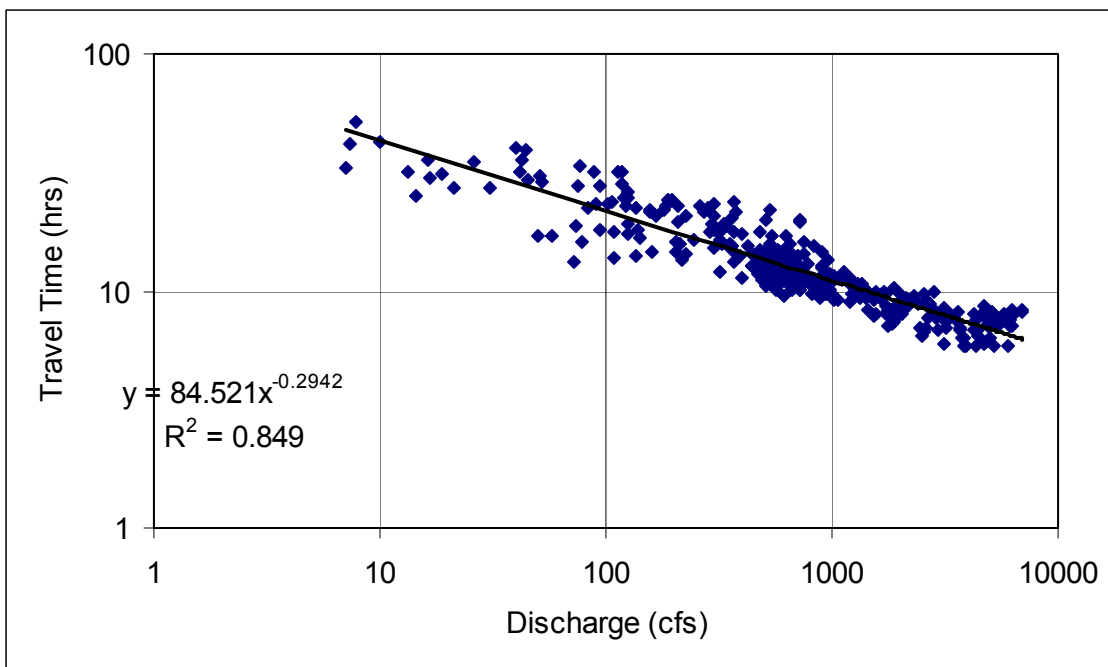
Graph 128. Cross section area versus discharge, Rio Grande Floodway at San Marcial.



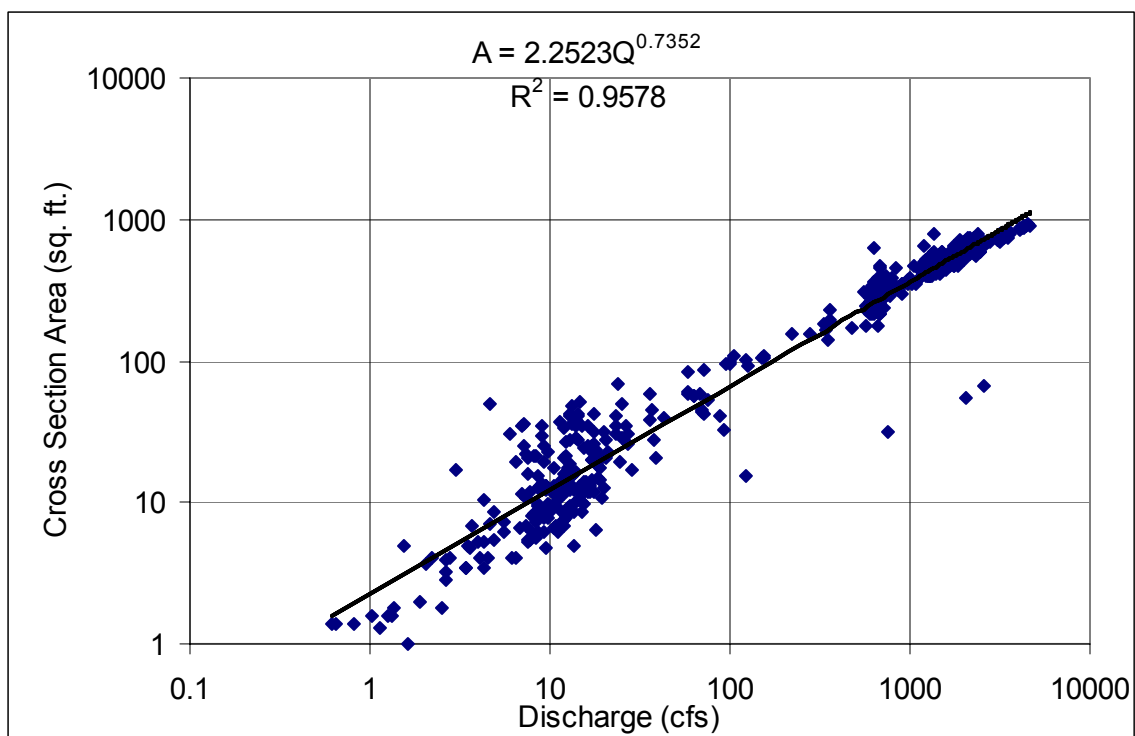
Graph 129. Travel time versus discharge, Rio Grande Floodway at San Acacia to Floodway at San Marcial (based on gage Floodway at San Acacia).



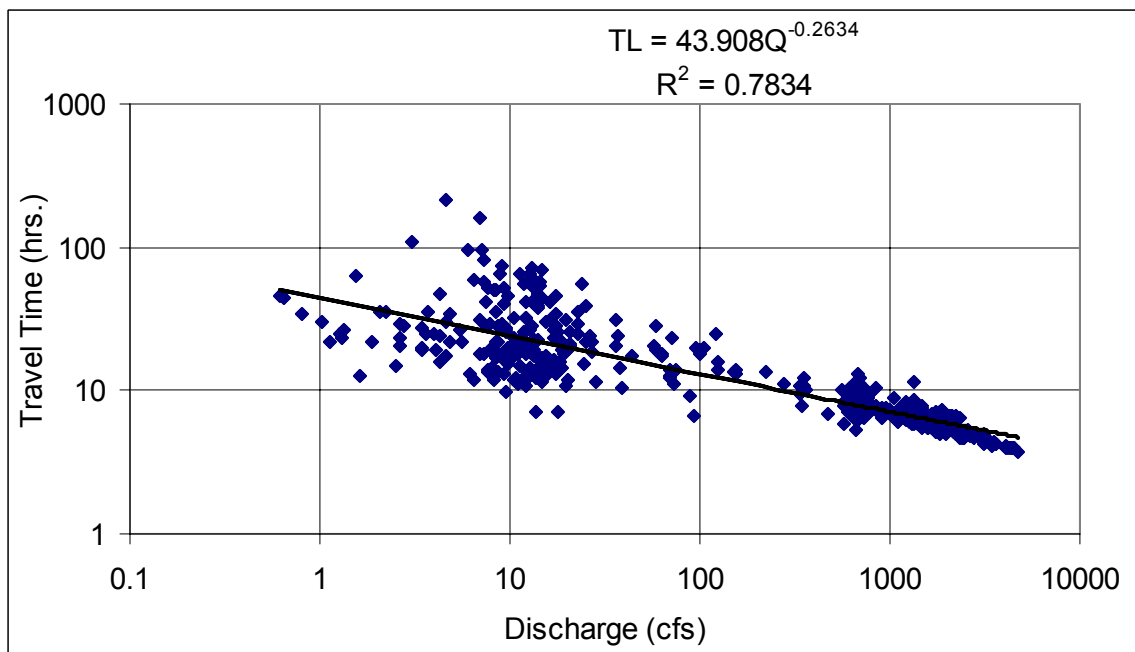
Graph 130. Travel time versus discharge, Rio Grande Floodway at San Acacia to Floodway at San Marcial (based on gage Floodway at San Marcial).



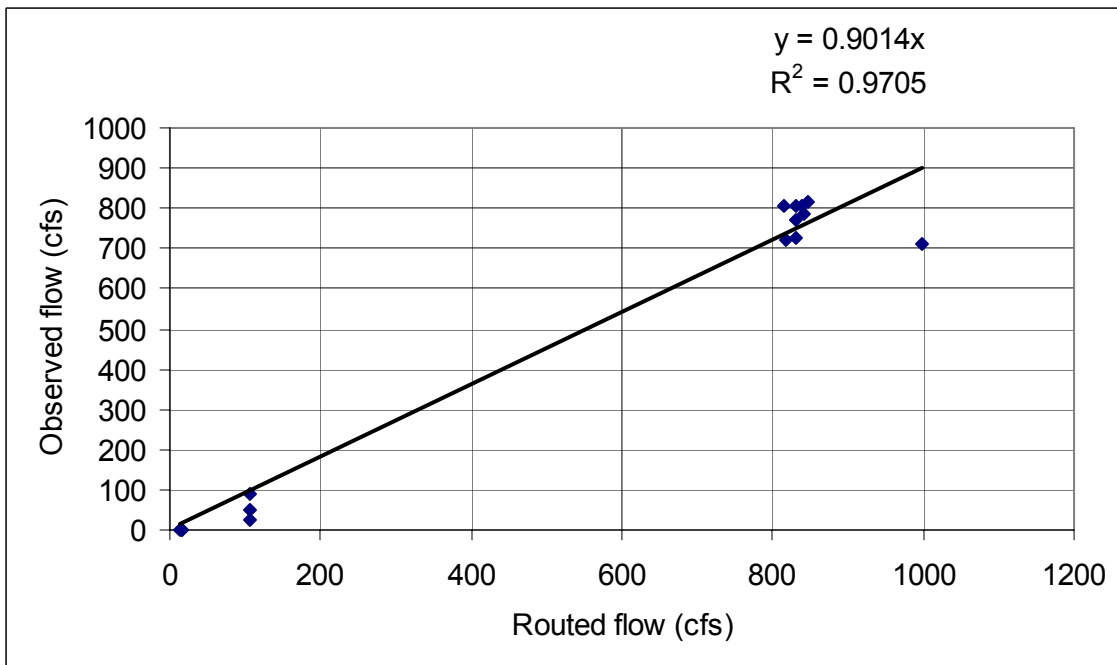
Graph 131. Travel time versus discharge, Rio Grande Floodway at San Marcial to below Elephant Butte Reservoir.



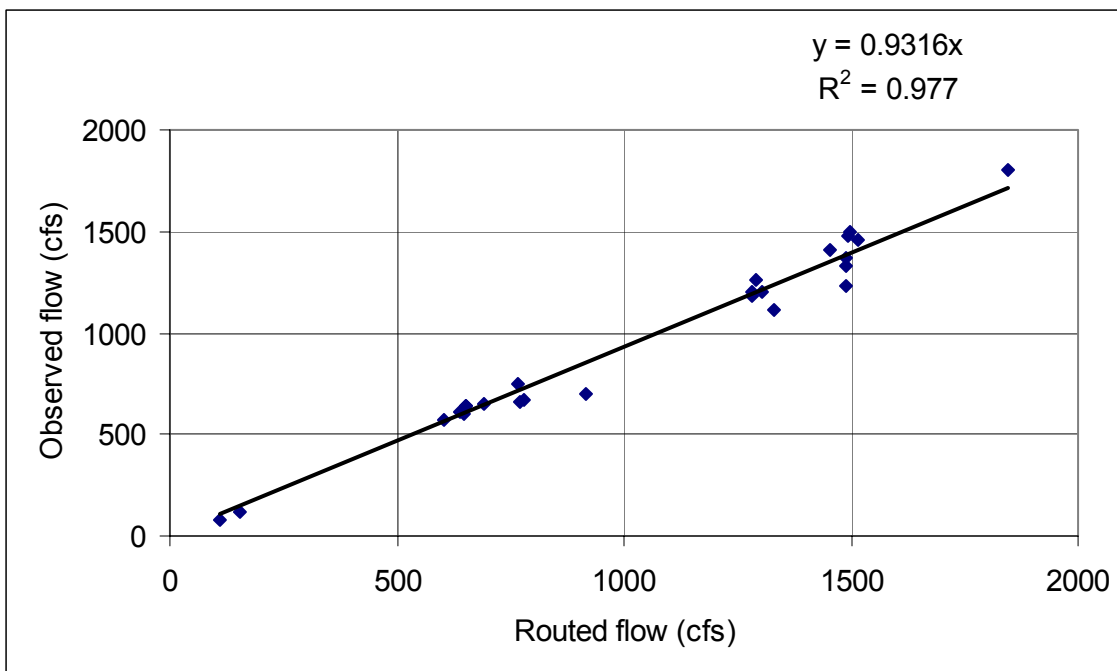
Graph 132. Cross section area versus discharge, Rio Grande below Elephant Butte Dam, 1970-99.



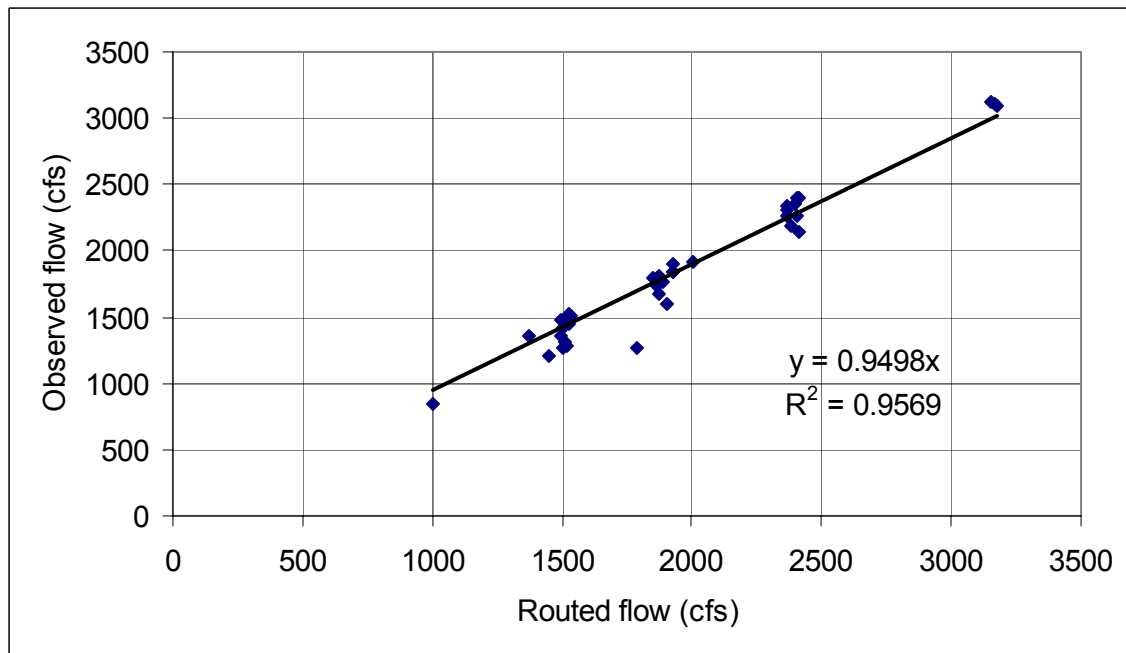
Graph 133. Travel time versus discharge, Rio Grande below Elephant Butte Dam to Caballo Reservoir (based on gage below Elephant Butte Dam, 1970-99).



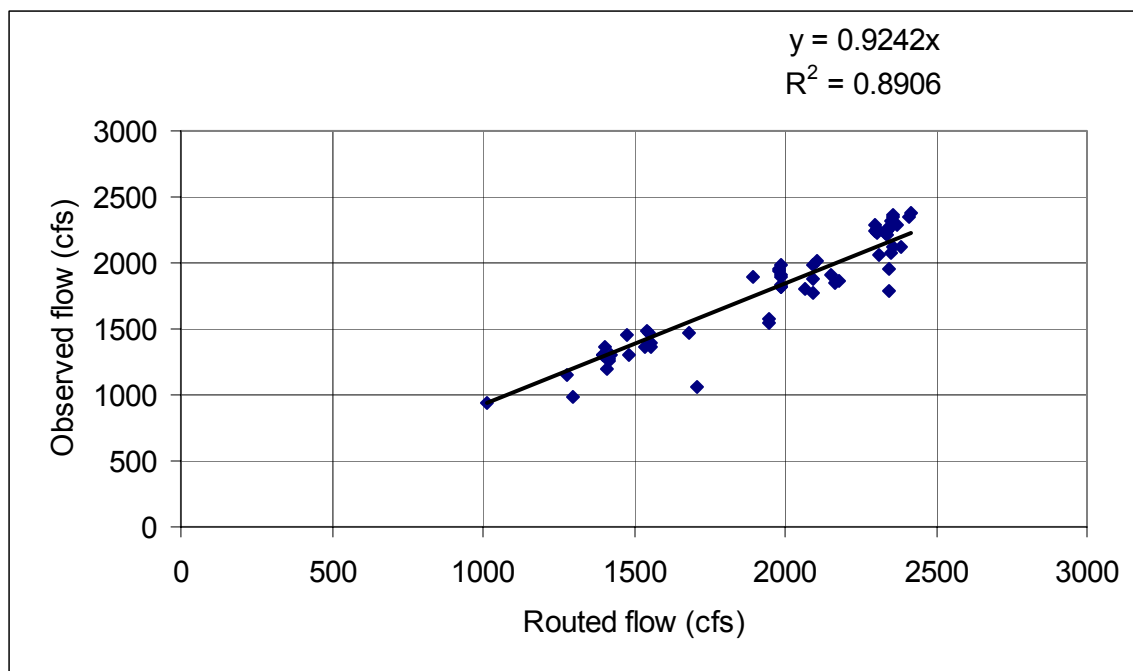
Graph 134. Observed flow versus routed flow, filtered for losses, Rio Grande below Elephant Butte Dam to Caballo Reservoir, January 1989-95.



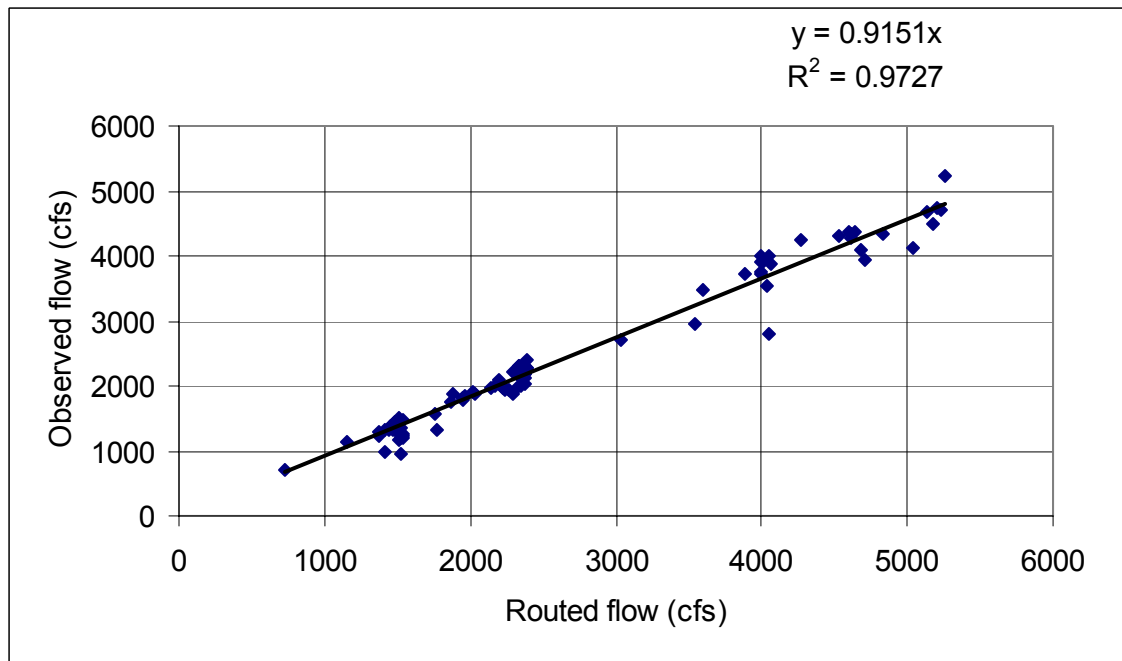
Graph 135. Observed flow versus routed flow, filtered for losses, Rio Grande below Elephant Butte Dam to Caballo Reservoir, February 1989-95.



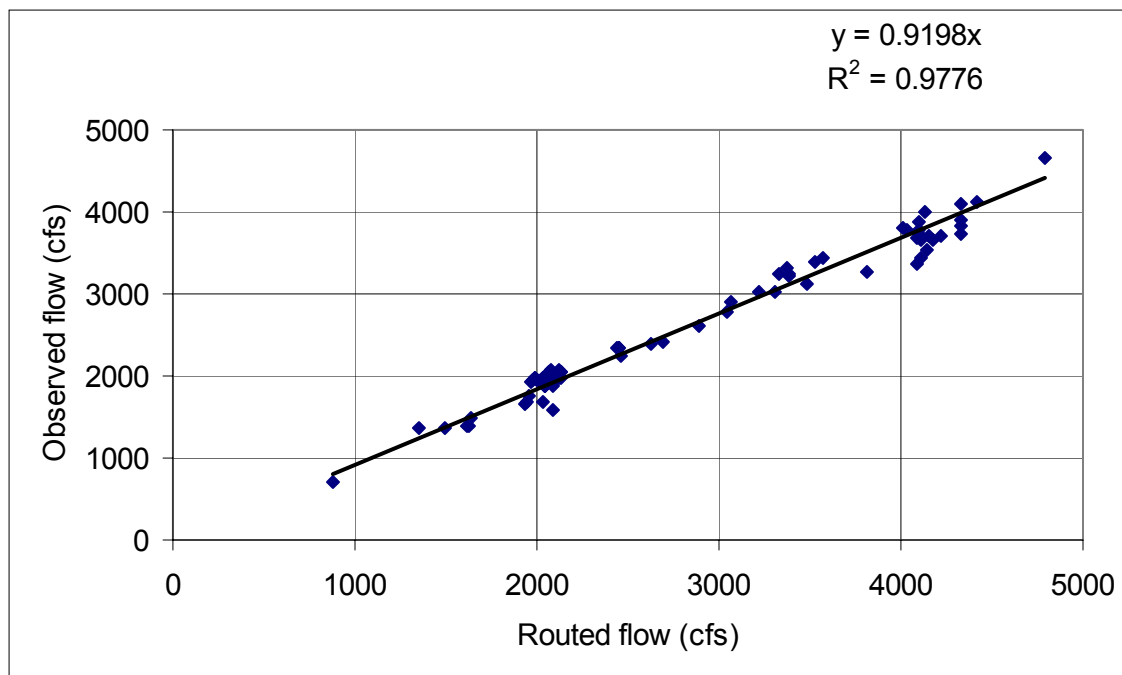
Graph 136. Observed flow versus routed flow, filtered for losses, Rio Grande below Elephant Butte Dam to Caballo Reservoir, March 1989-95.



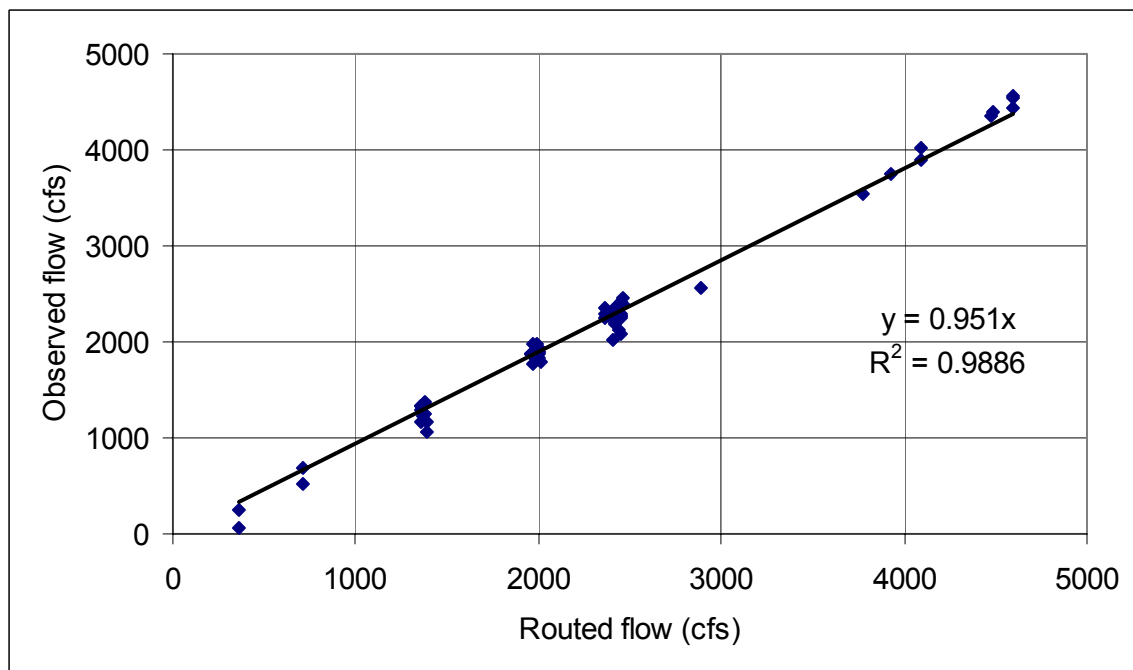
Graph 137. Observed flow versus routed flow, filtered for losses, Rio Grande below Elephant Butte Dam to Caballo Reservoir, April 1989-95.



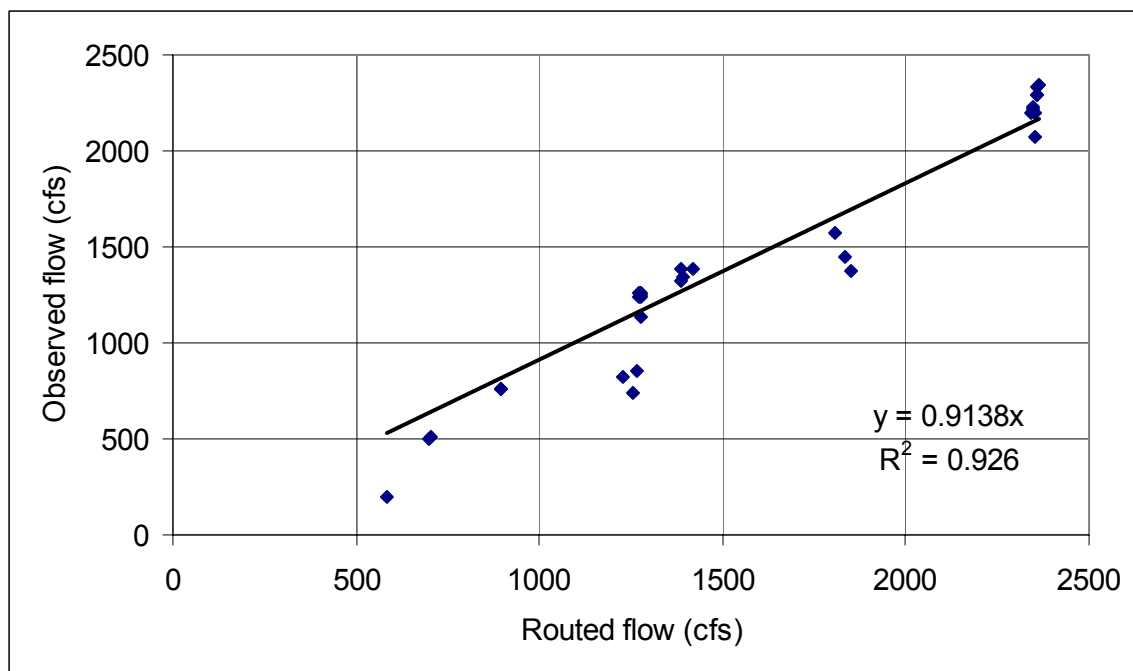
Graph 138. Observed flow versus routed flow, filtered for losses, Rio Grande below Elephant Butte Dam to Caballo Reservoir, May 1989-95.



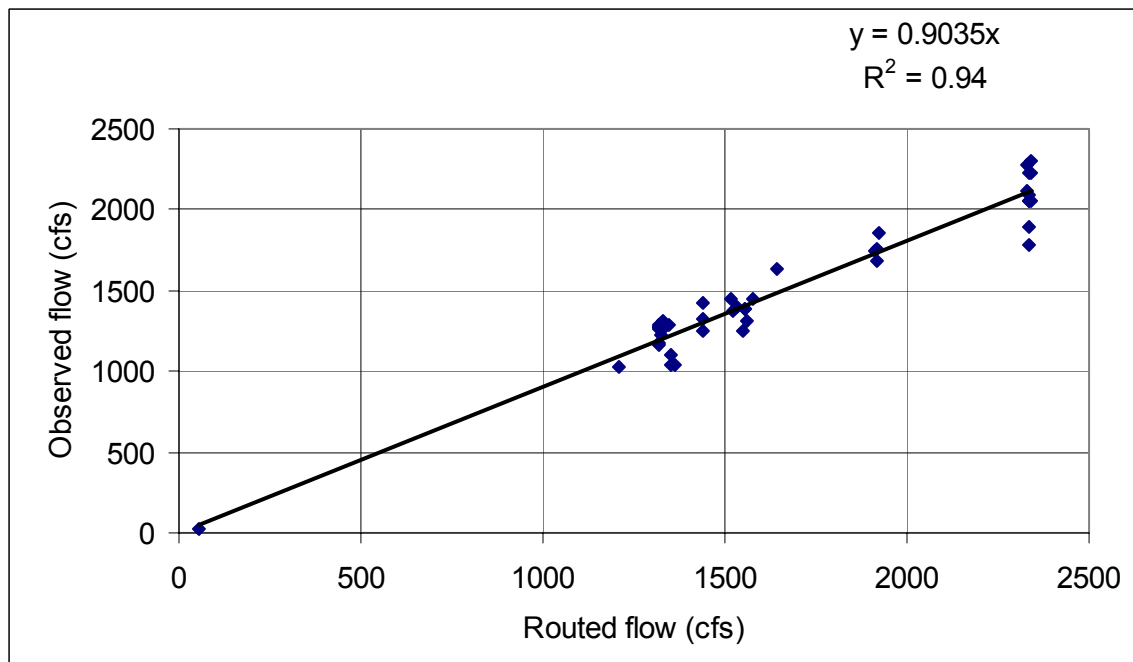
Graph 139. Observed flow versus routed flow, filtered for losses, Rio Grande below Elephant Butte Dam to Caballo Reservoir, June 1989-95.



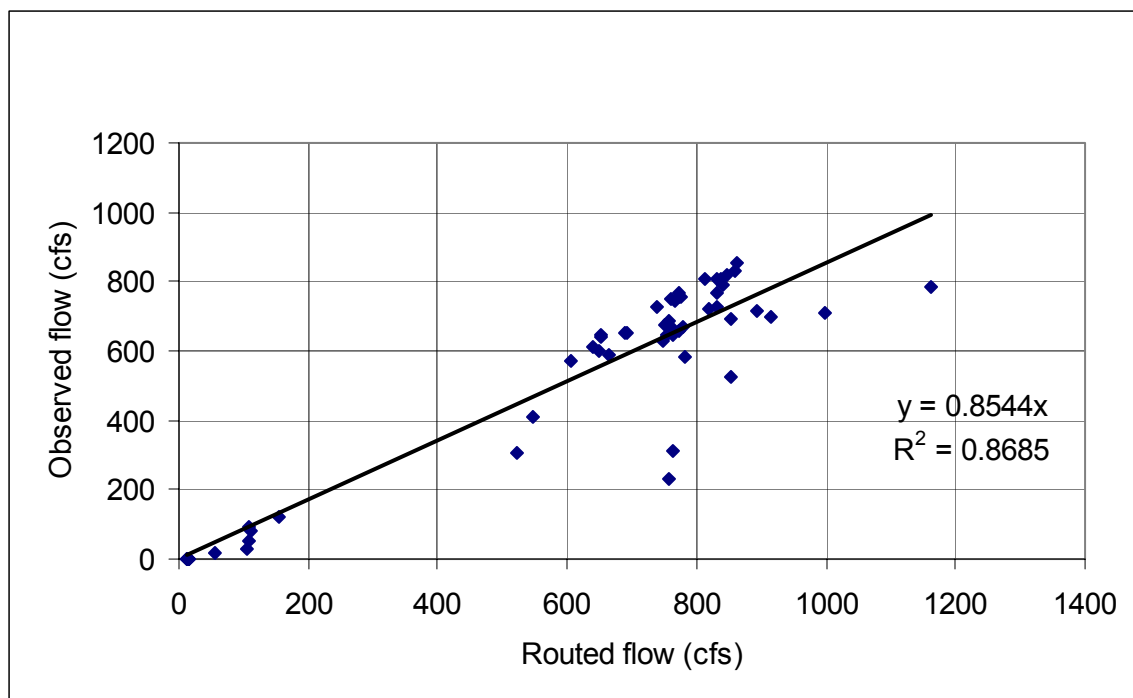
Graph 140. Observed flow versus routed flow, filtered for losses, Rio Grande below Elephant Butte Dam to Caballo Reservoir, July 1989-95.



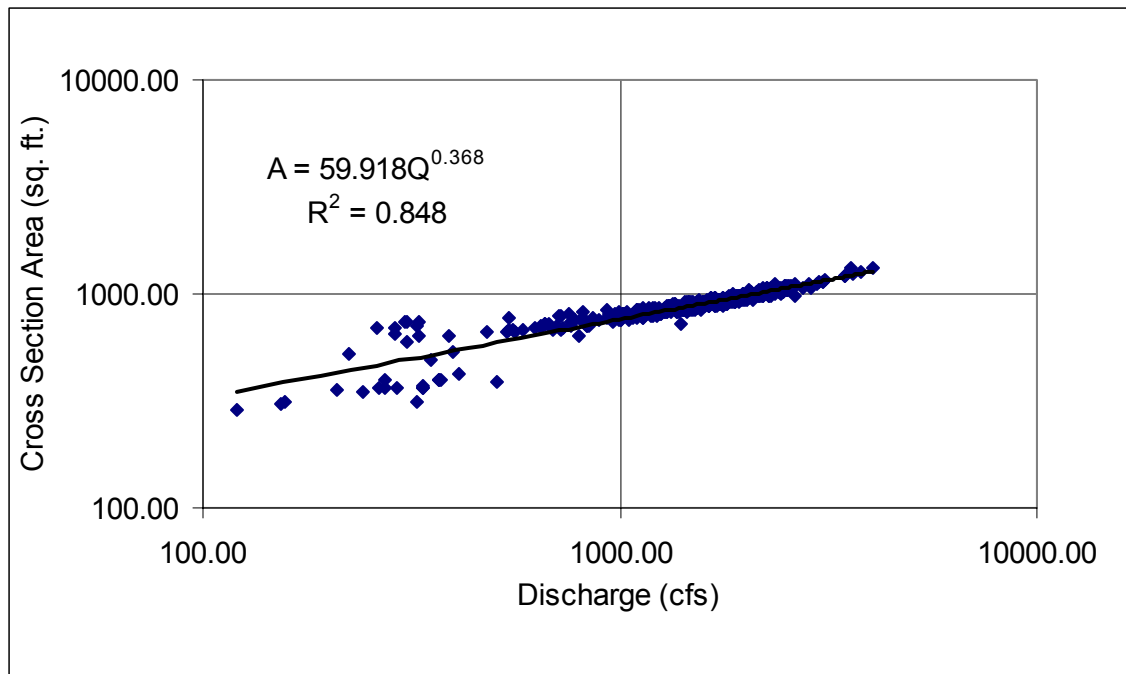
Graph 141. Observed flow versus routed flow, filtered for losses, Rio Grande below Elephant Butte Dam to Caballo Reservoir, August 1989-95.



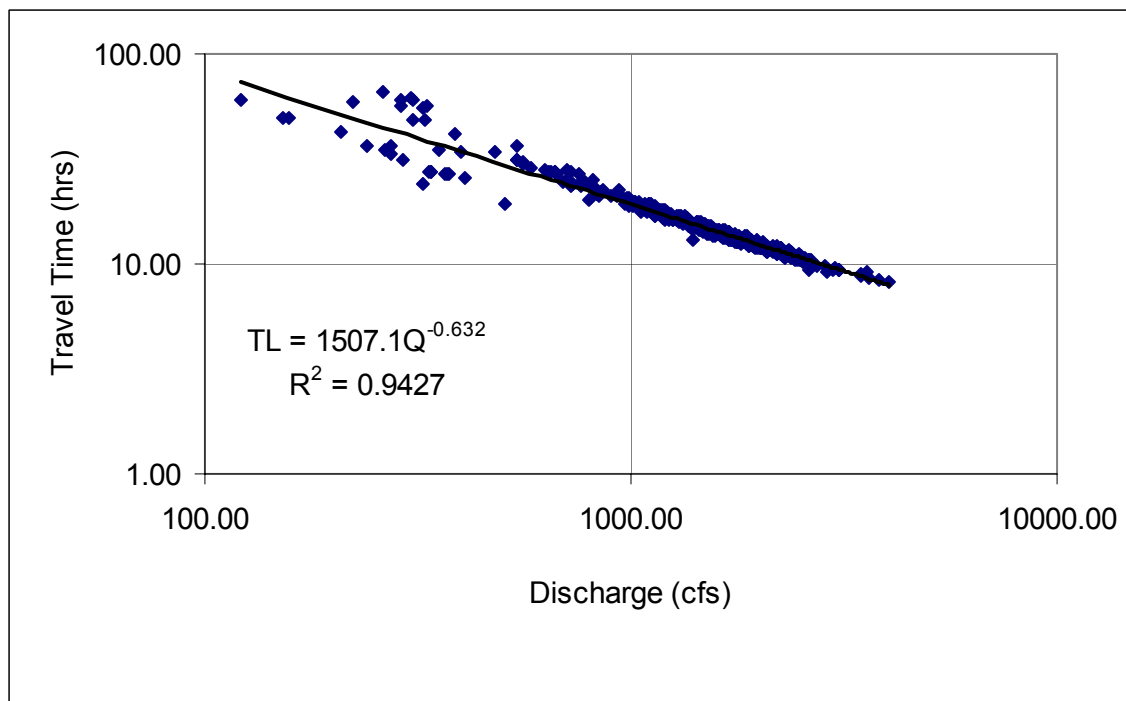
Graph 142. Observed flow versus routed flow, filtered for losses, Rio Grande below Elephant Butte Dam to Caballo Reservoir, September 1989-95.



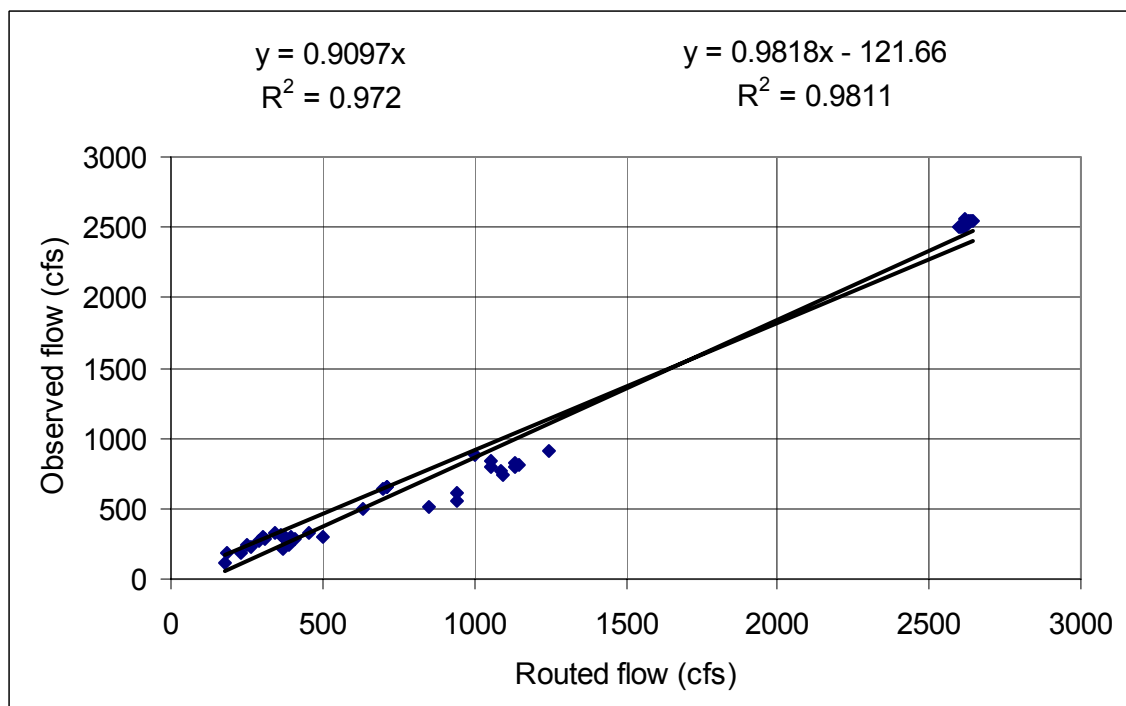
Graph 143. Observed low flow versus routed low flow, filtered for losses, Rio Grande below Elephant Butte Dam to Caballo Reservoir, September - February 1989-95.



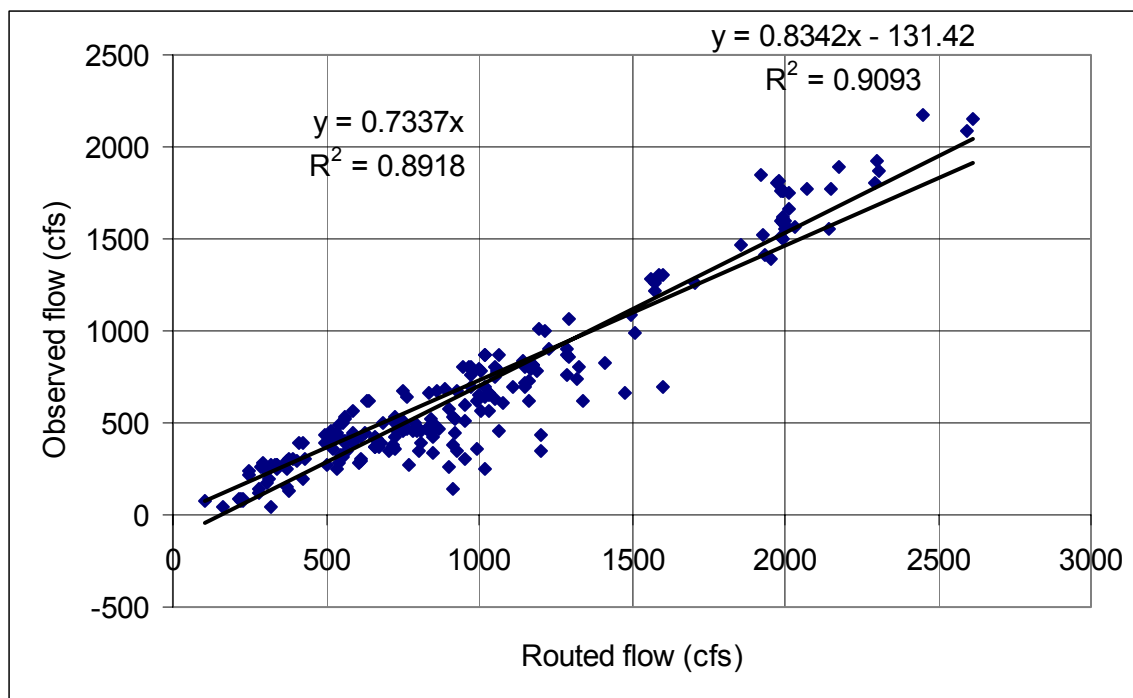
Graph 144. Cross section area versus discharge, Rio Grande below Caballo Dam.



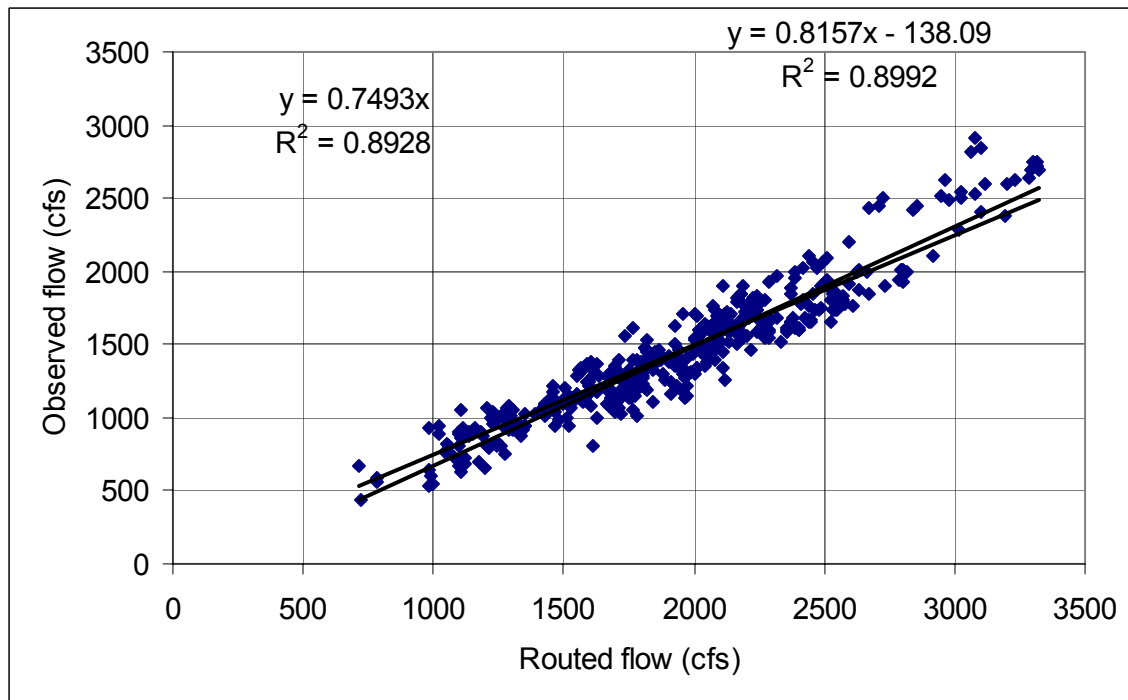
Graph 145. Travel time versus discharge, Rio Grande below Caballo Dam to below Leasburg Dam (based on gage below Caballo Dam).



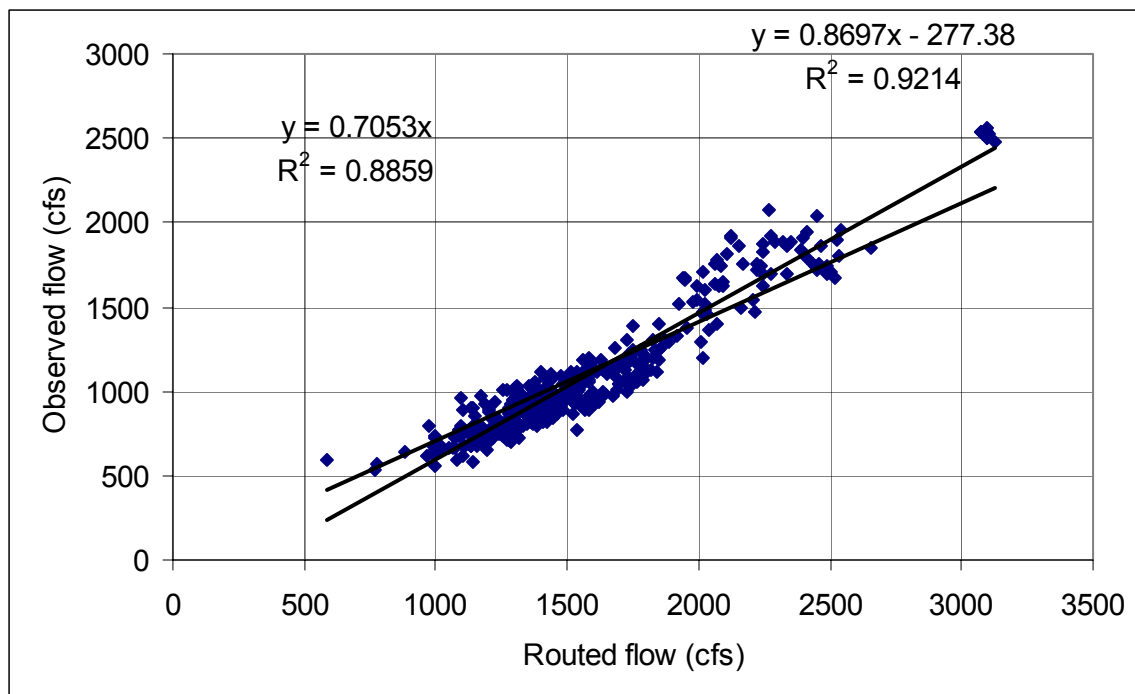
Graph 146. Observed flow versus routed flow, filtered for losses, Rio Grande below Caballo Dam to below Leasburg Dam, January 1986-99.



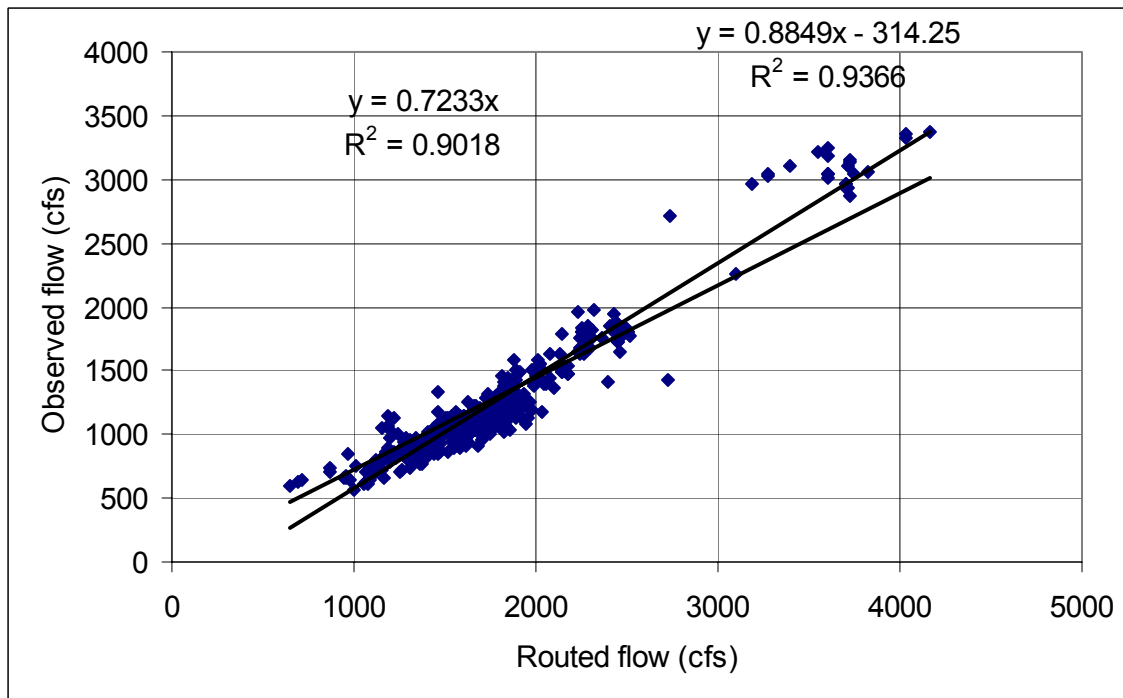
Graph 147. Observed flow versus routed flow, filtered for losses, Rio Grande below Caballo Dam to below Leasburg Dam, February 1986-99.



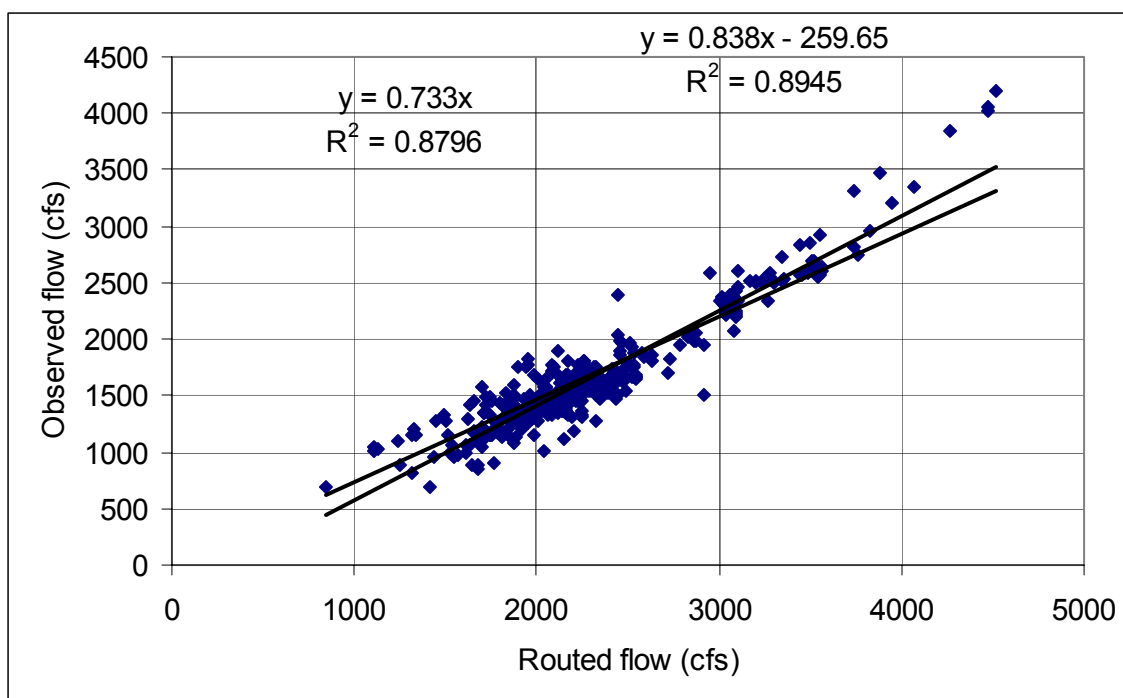
Graph 148. Observed flow versus routed flow, filtered for losses, Rio Grande below Caballo Dam to below Leasburg Dam, March 1986-99.



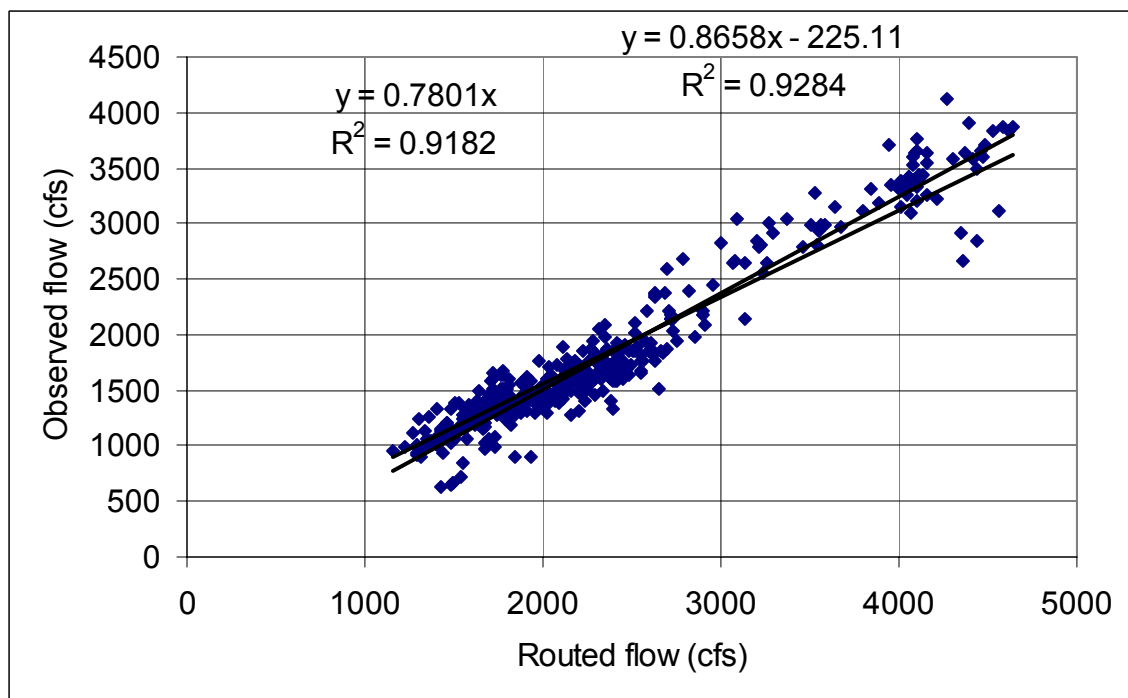
Graph 149. Observed flow versus routed flow, filtered for losses, Rio Grande below Caballo Dam to below Leasburg Dam, April 1986-99.



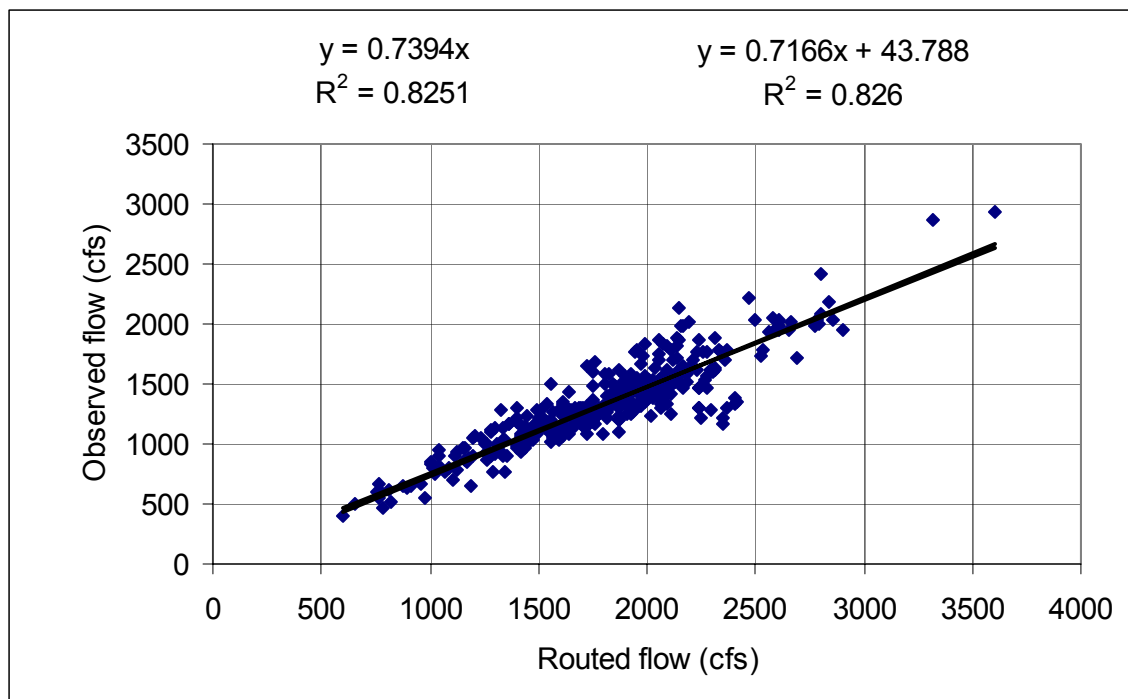
Graph 150. Observed flow versus routed flow, filtered for losses, Rio Grande below Caballo Dam to below Leasburg Dam, May 1986-99.



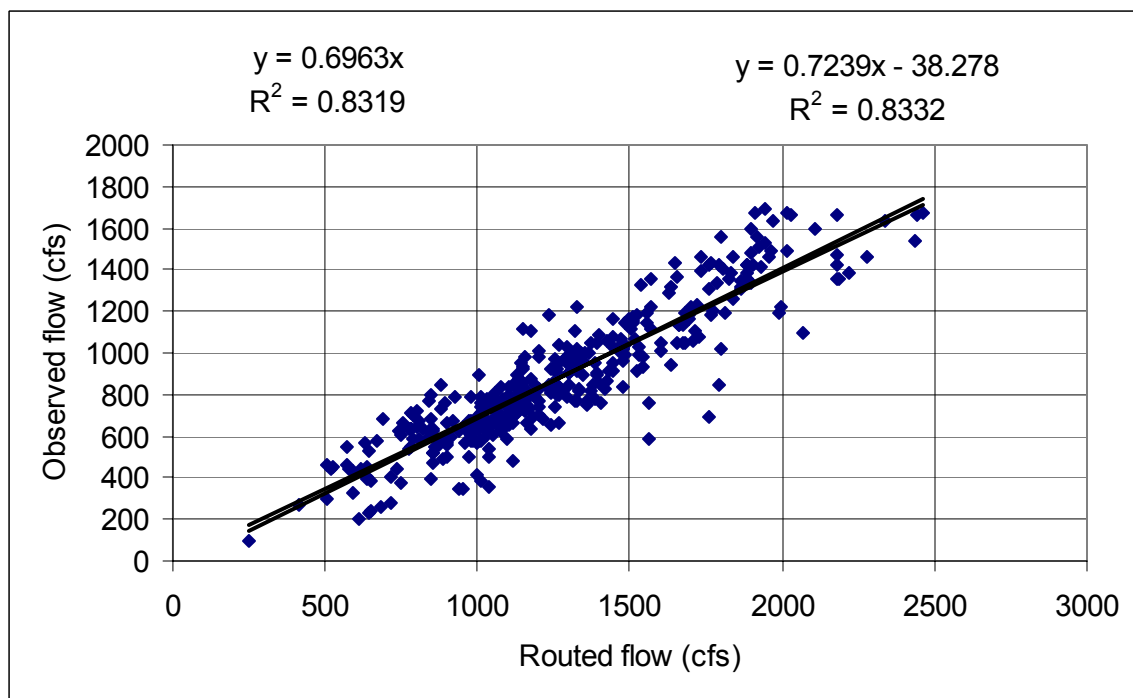
Graph 151. Observed flow versus routed flow, filtered for losses, Rio Grande below Caballo Dam to below Leasburg Dam, June 1986-99.



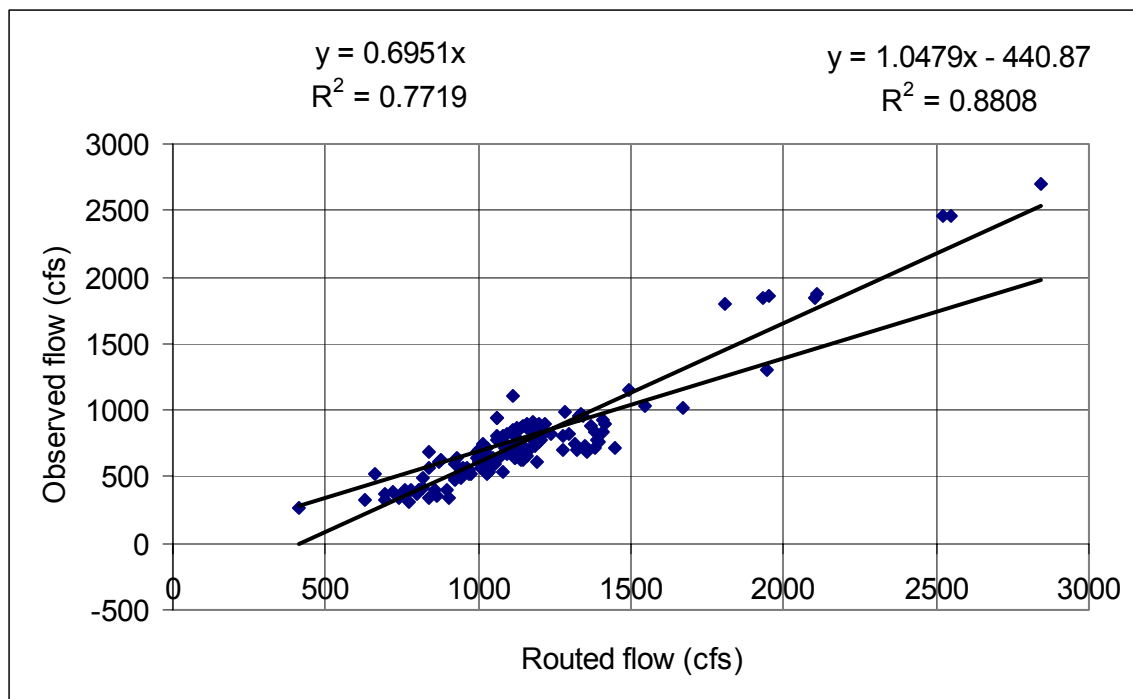
Graph 152. Observed flow versus routed flow, filtered for losses, Rio Grande below Caballo Dam to below Leasburg Dam, July 1986-99.



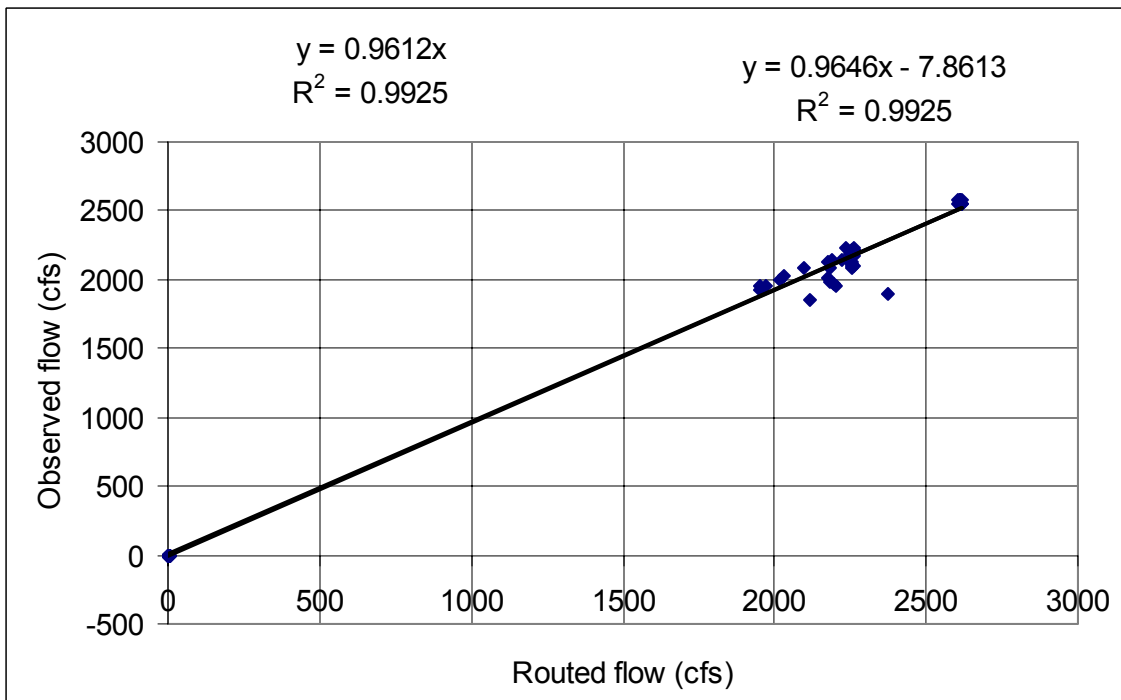
Graph 153. Observed flow versus routed flow, filtered for losses, Rio Grande below Caballo Dam to below Leasburg Dam, August 1986-99.



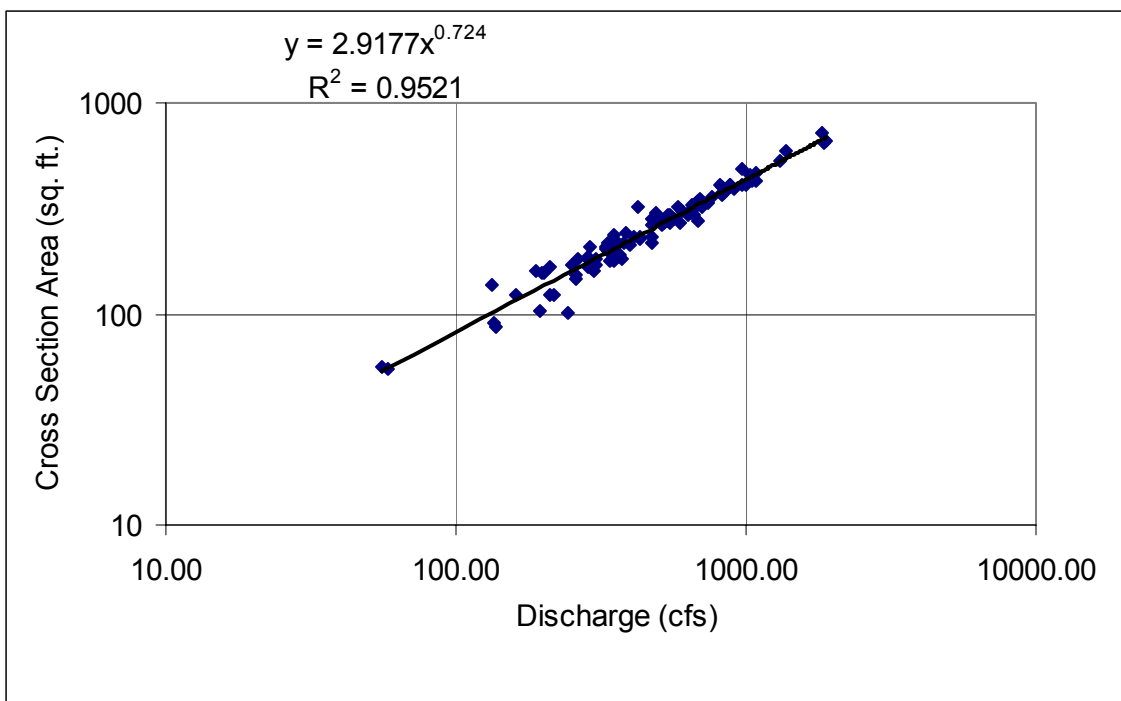
Graph 154. Observed flow versus routed flow, filtered for losses, Rio Grande below Caballo Dam to below Leasburg Dam, September 1986-99.



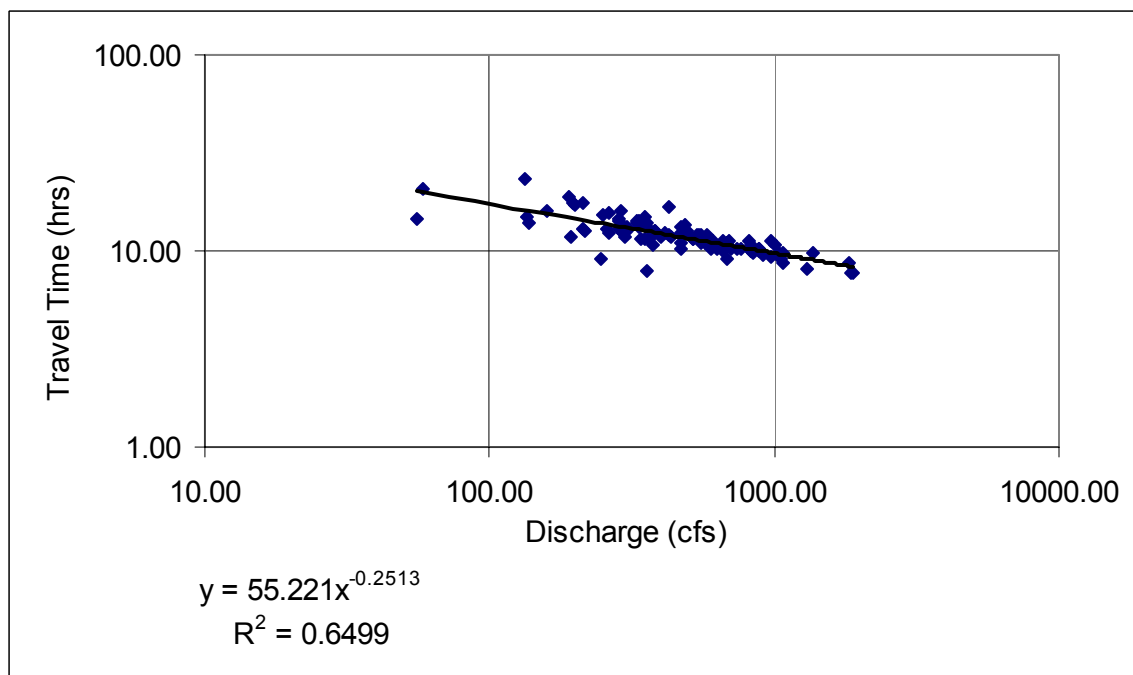
Graph 155. Observed flow versus routed flow, filtered for losses, Rio Grande below Caballo Dam to below Leasburg Dam, October 1986-99.



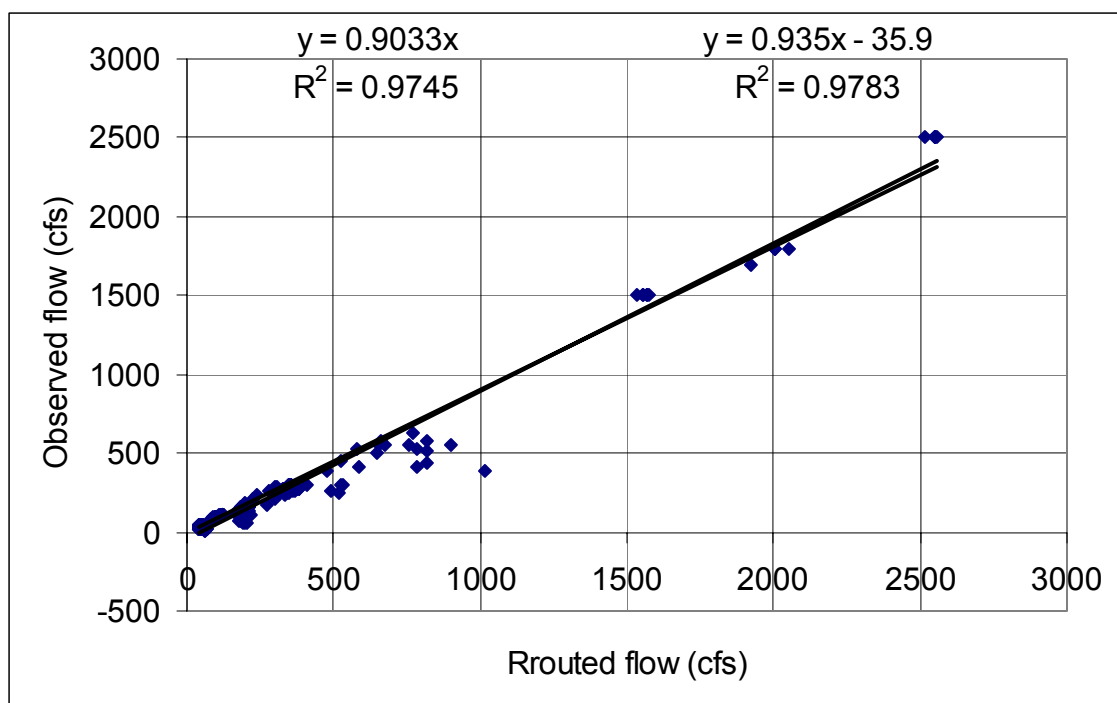
Graph 156. Observed flow versus routed flow, filtered for losses, Rio Grande below Caballo Dam to below Leasburg Dam, November - December 1986-99.



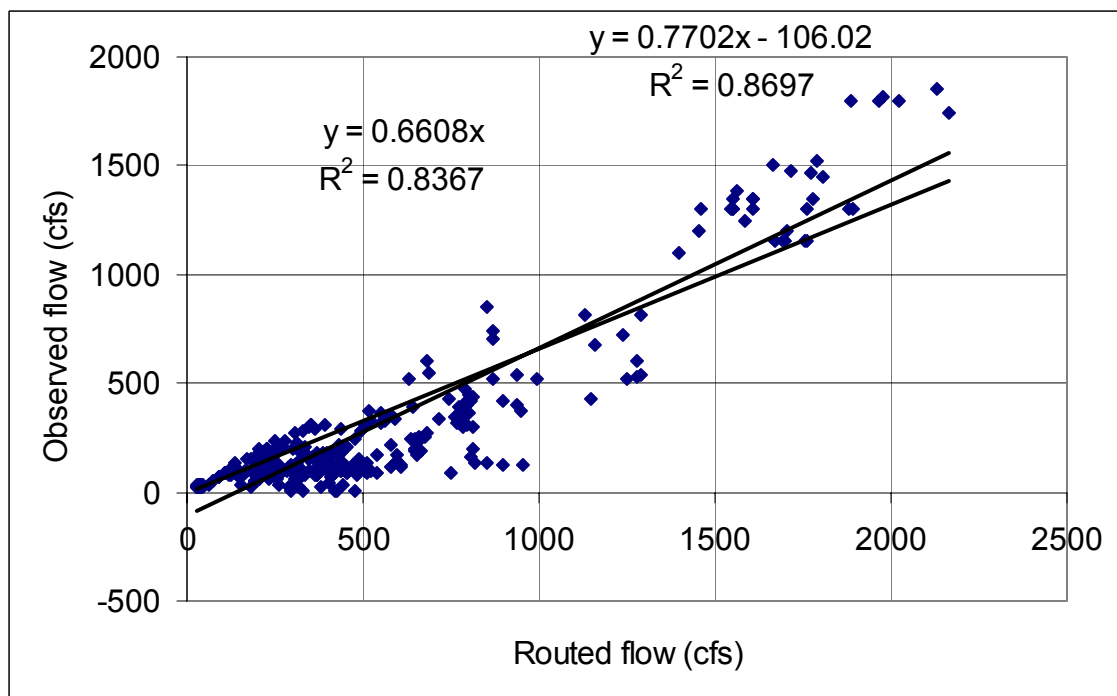
Graph 157. Cross section area versus discharge, Rio Grande below Mesilla Dam.



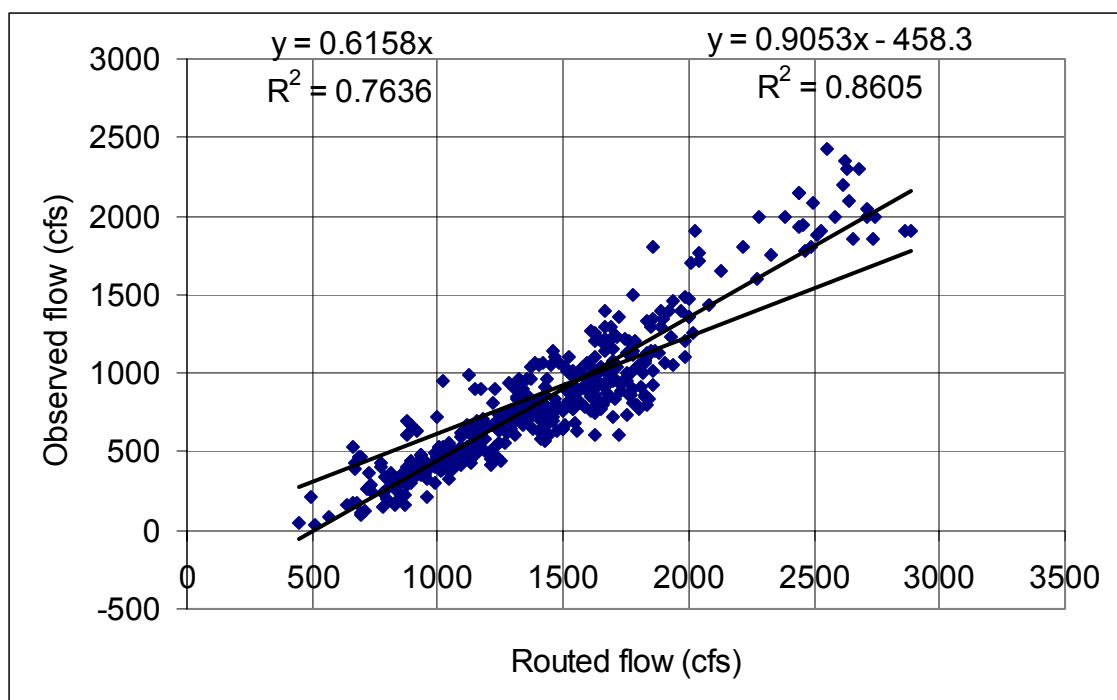
Graph 158. Travel time versus discharge, Rio Grande below Leasburg Dam to below Mesilla Dam (based on gage below Mesilla Dam).



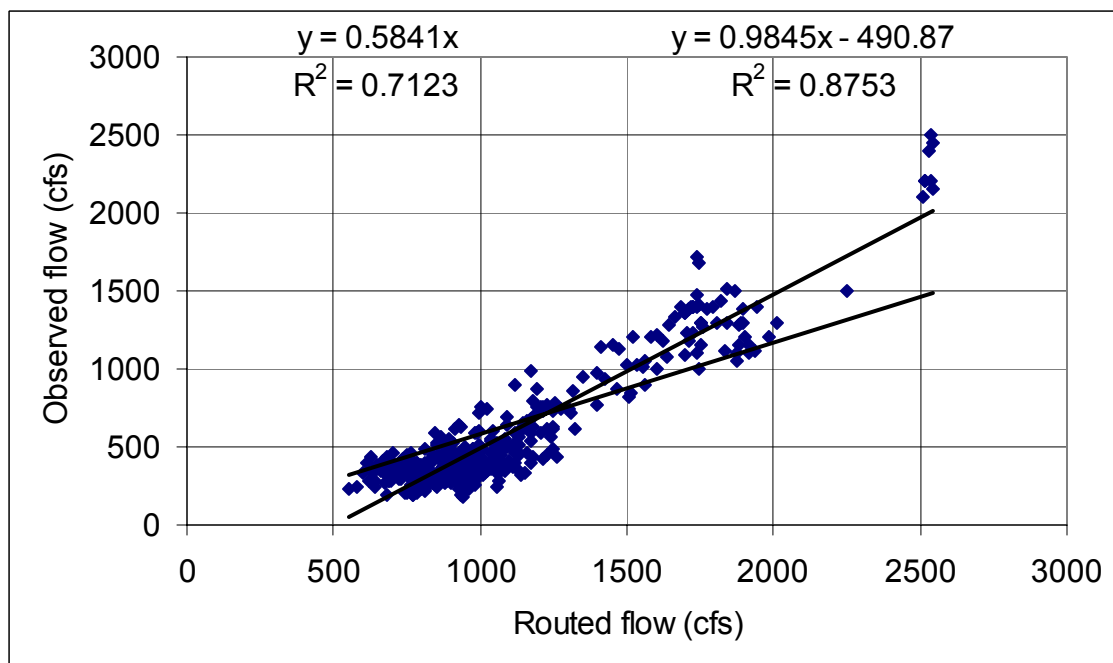
Graph 159. Observed flow versus routed flow, filtered for losses, Rio Grande below Leasburg Dam to below Mesilla Dam, January 1985-98.



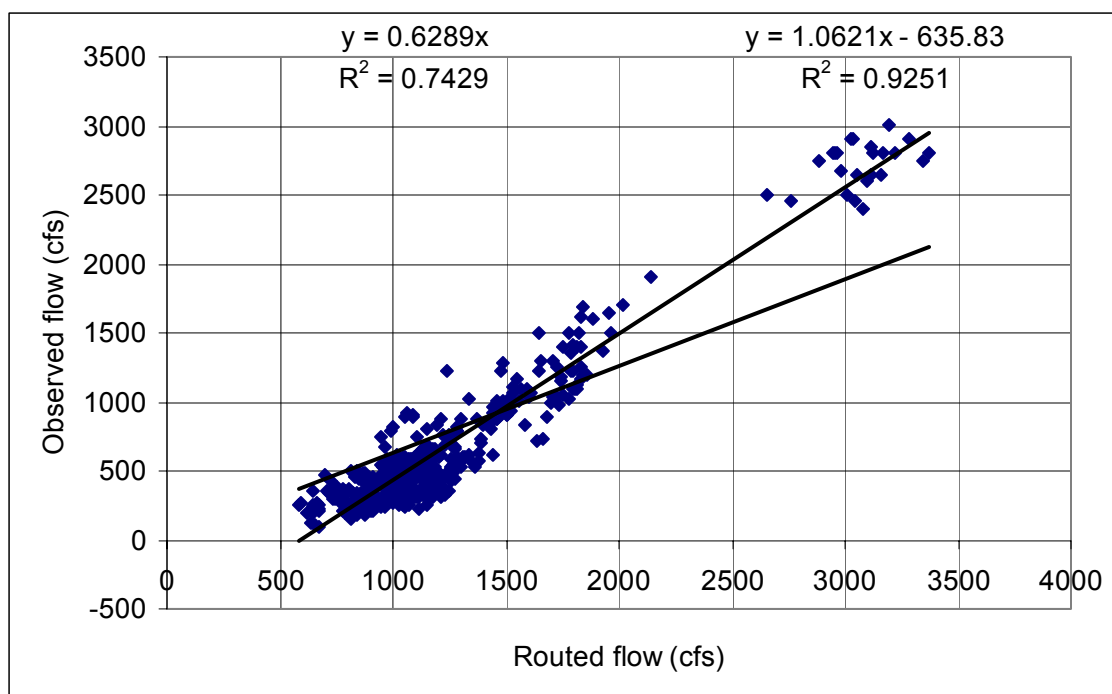
Graph 160. Observed flow versus routed flow, filtered for losses, Rio Grande below Leasburg Dam to below Mesilla Dam, February 1985-98.



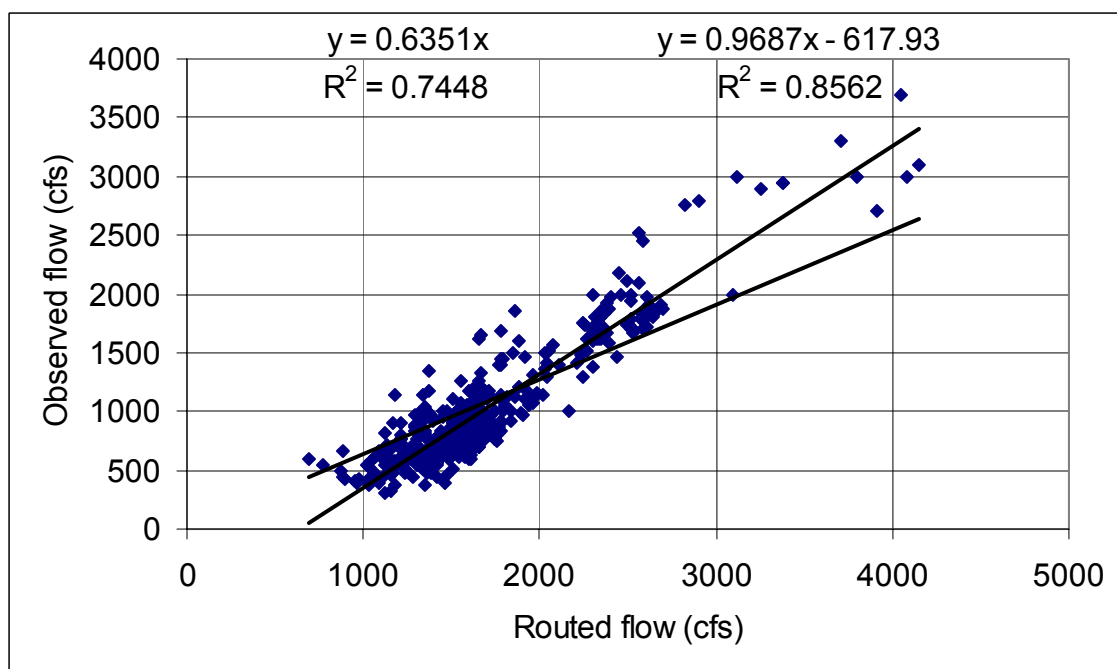
Graph 161. Observed flow versus routed flow, filtered for losses, Rio Grande below Leasburg Dam to below Mesilla Dam, March 1985-98.



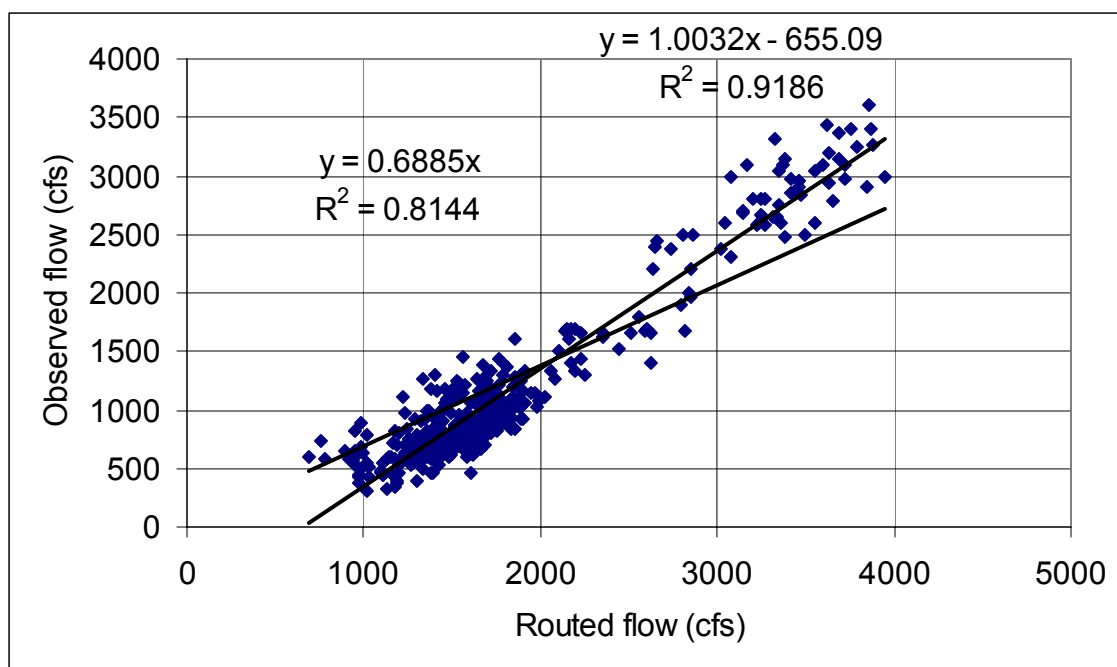
Graph 162. Observed flow versus routed flow, filtered for losses, Rio Grande below Leasburg Dam to below Mesilla Dam, April 1985-98.



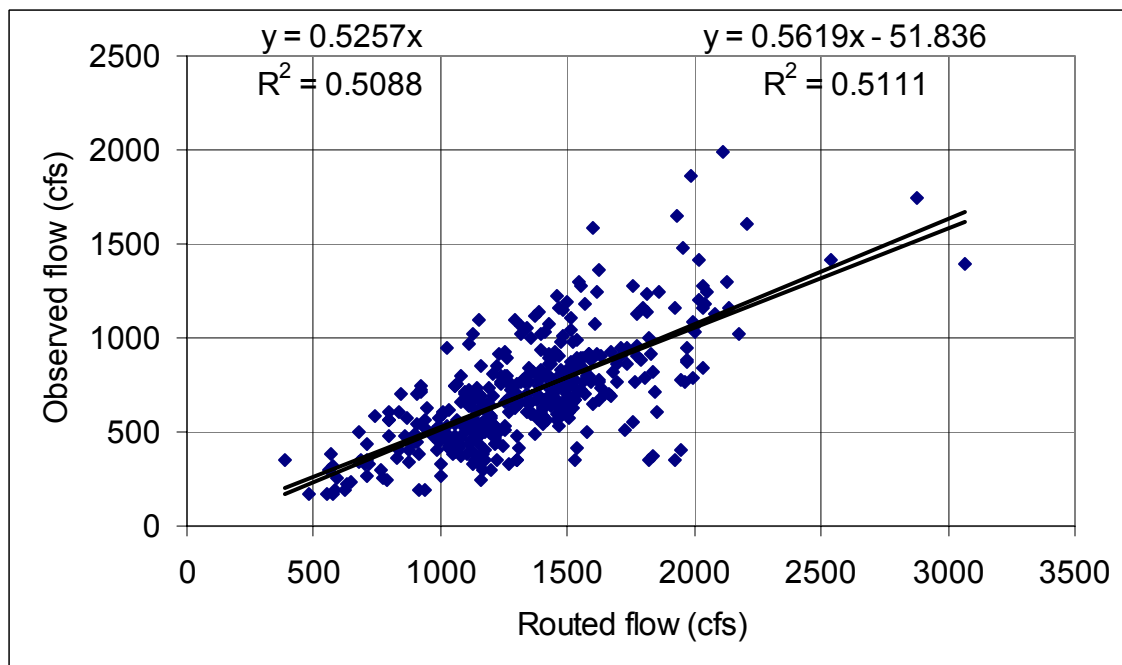
Graph 163. Observed flow versus routed flow, filtered for losses, Rio Grande below Leasburg Dam to below Mesilla Dam, May 1985-98.



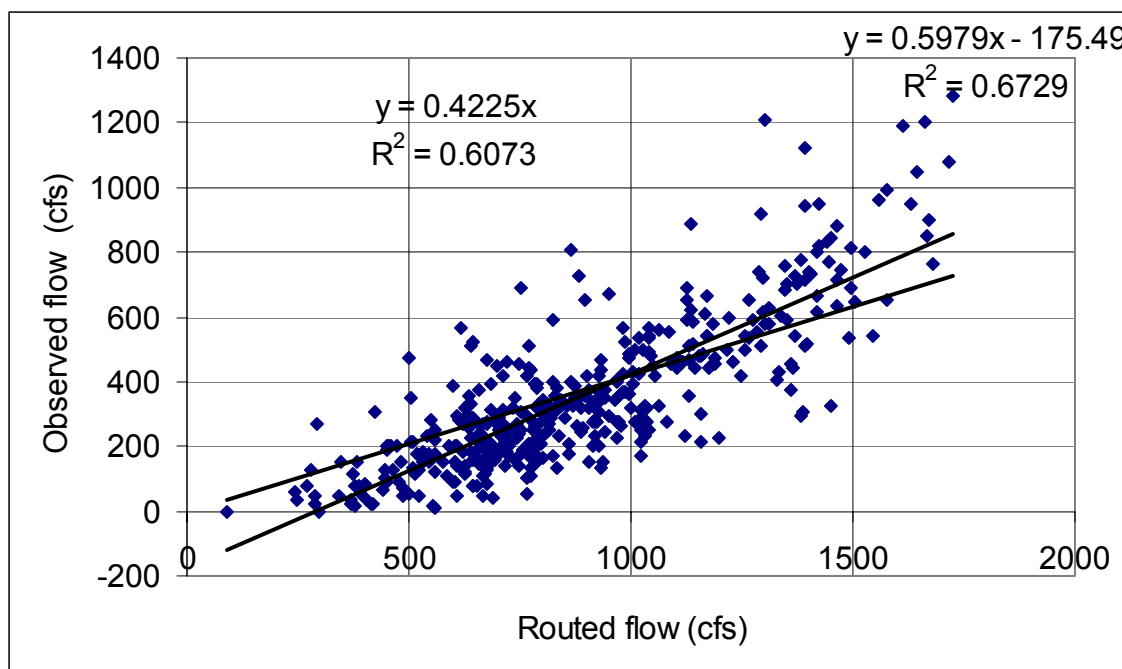
Graph 164. Observed flow versus routed flow, filtered for losses, Rio Grande below Leasburg Dam to below Mesilla Dam, June 1985-98.



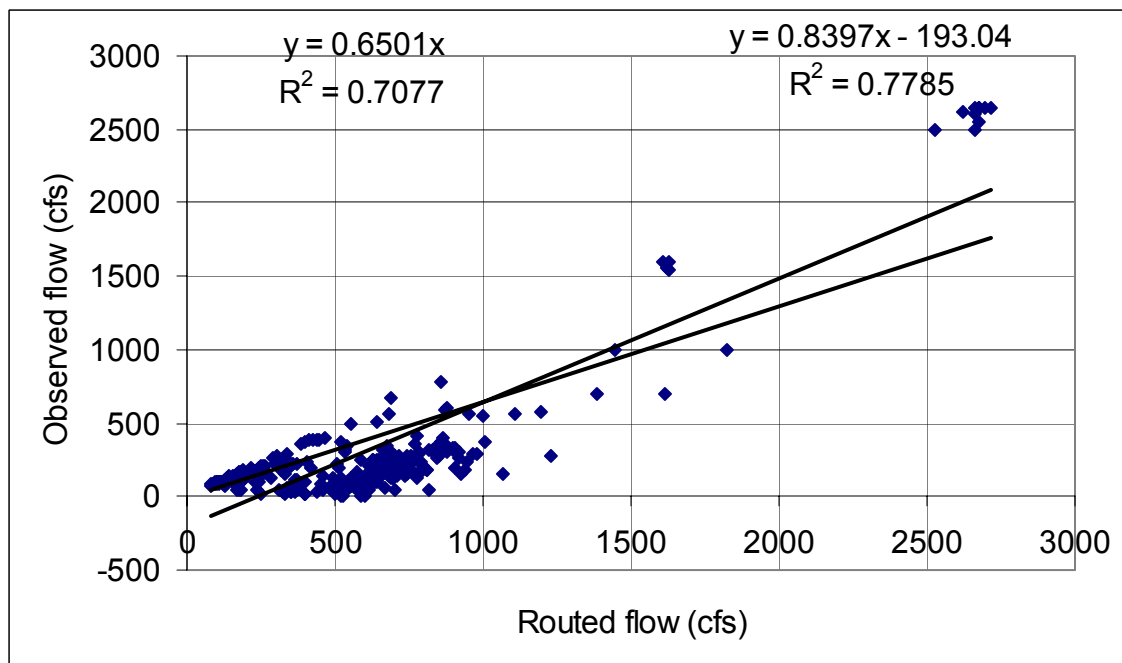
Graph 165. Observed flow versus routed flow, filtered for losses, Rio Grande below Leasburg Dam to below Mesilla Dam, July 1985-98.



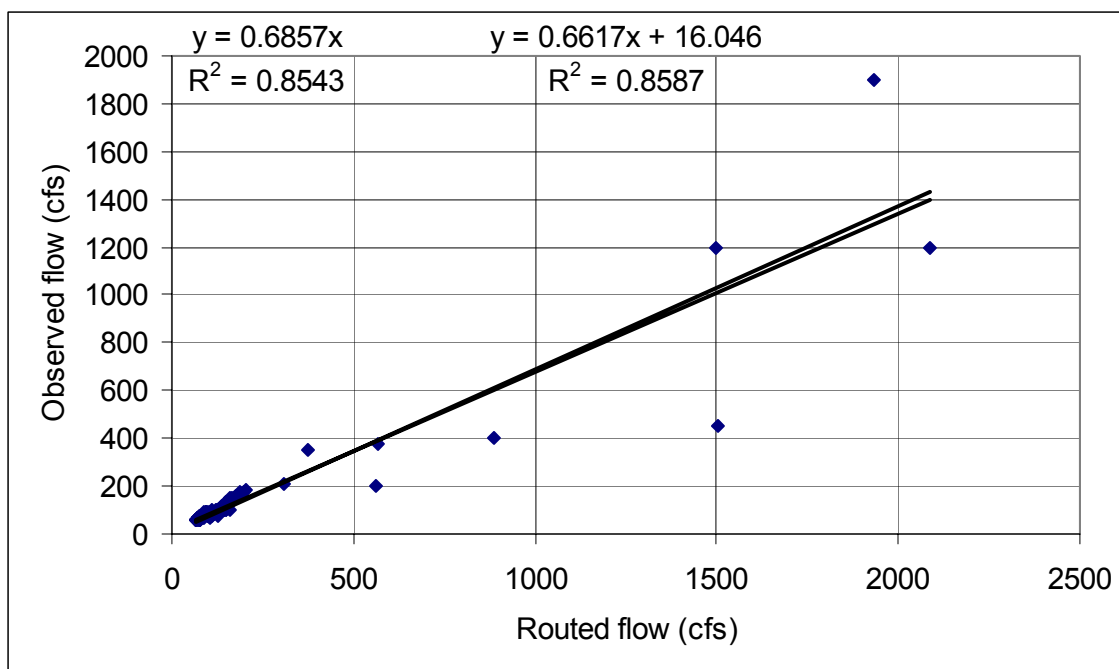
Graph 166. Observed flow versus routed flow, filtered for losses, Rio Grande below Leasburg Dam to below Mesilla Dam, August 1985-98.



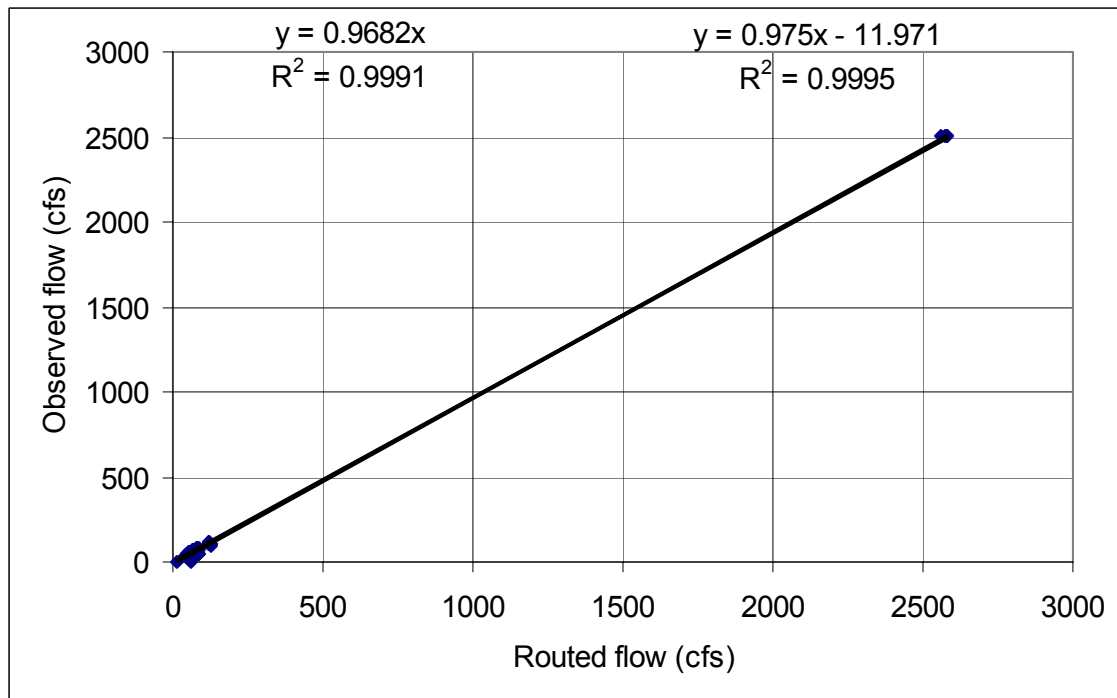
Graph 167. Observed flow versus routed flow, filtered for losses, Rio Grande below Leasburg Dam to below Mesilla Dam, September 1985-98.



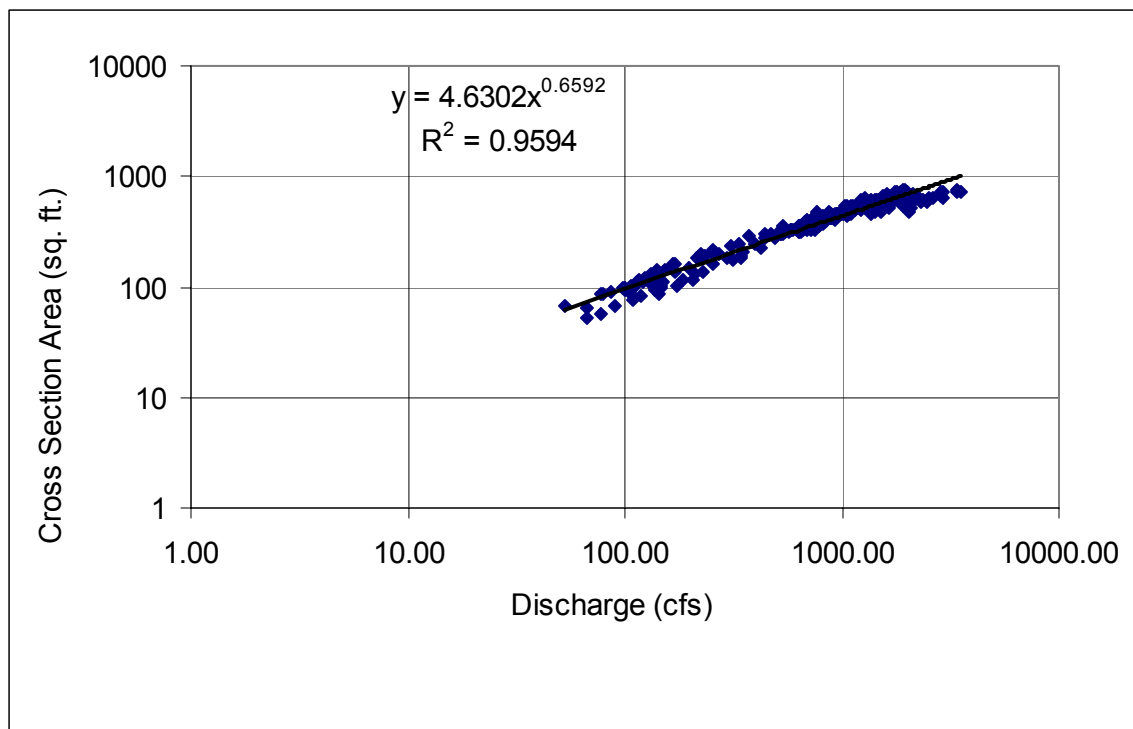
Graph 168. Observed flow versus routed flow, filtered for losses, Rio Grande below Leasburg Dam to below Mesilla Dam, October 1985-98.



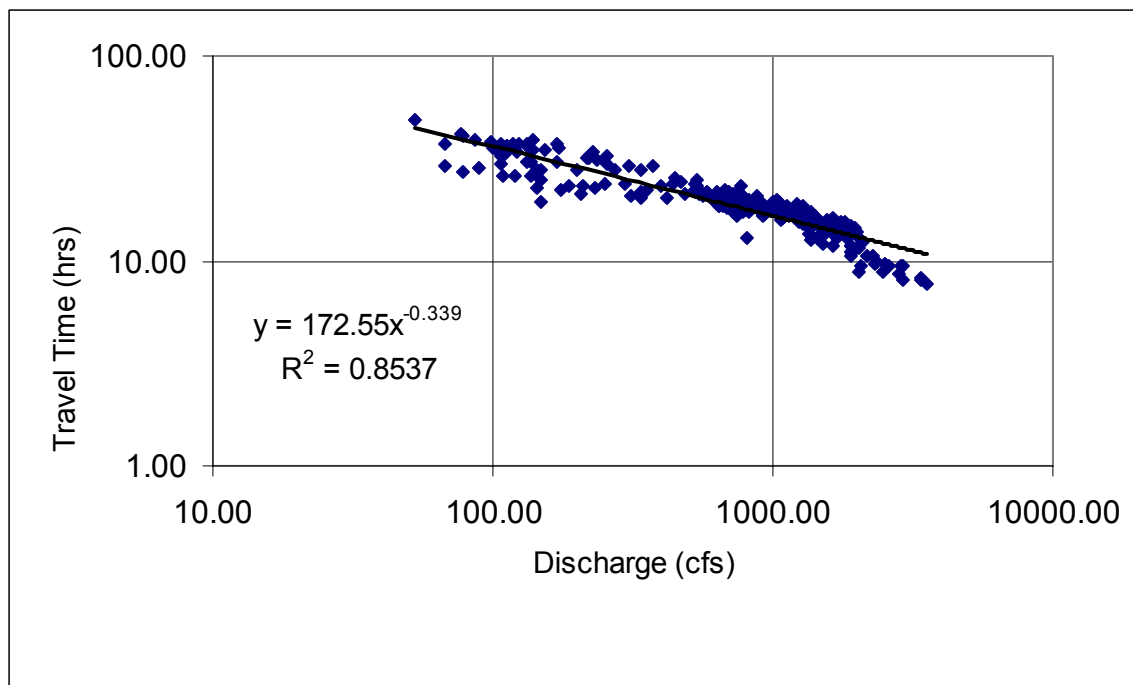
Graph 169. Observed flow versus routed flow, filtered for losses, Rio Grande below Leasburg Dam to below Mesilla Dam, November 1985-98.



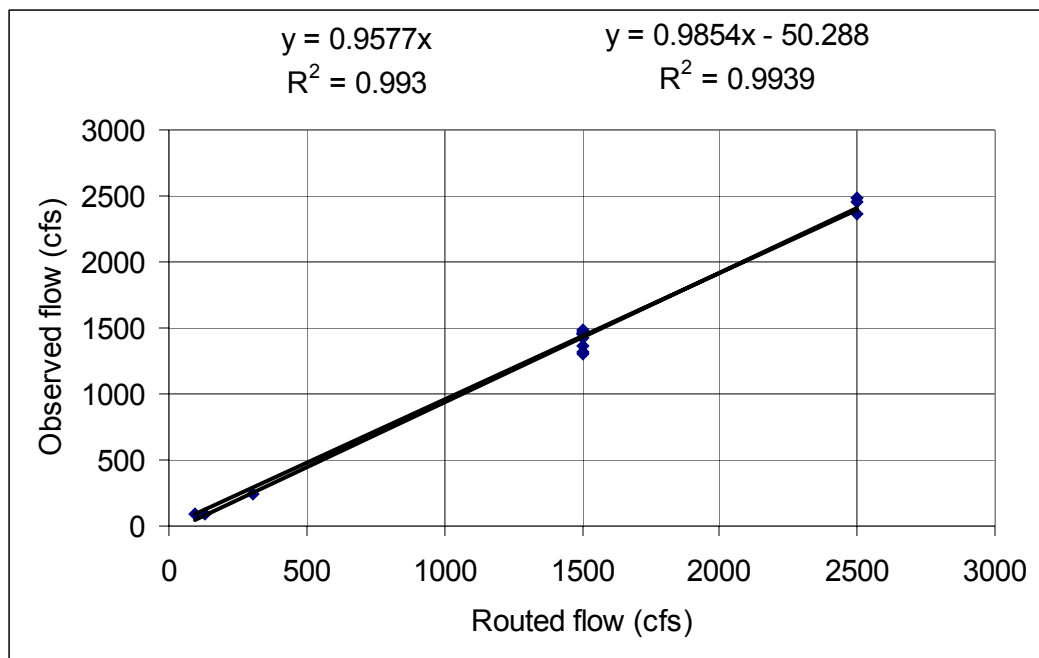
Graph 170. Observed flow versus routed flow, filtered for losses, Rio Grande below Leasburg Dam to below Mesilla Dam, December 1985-98.



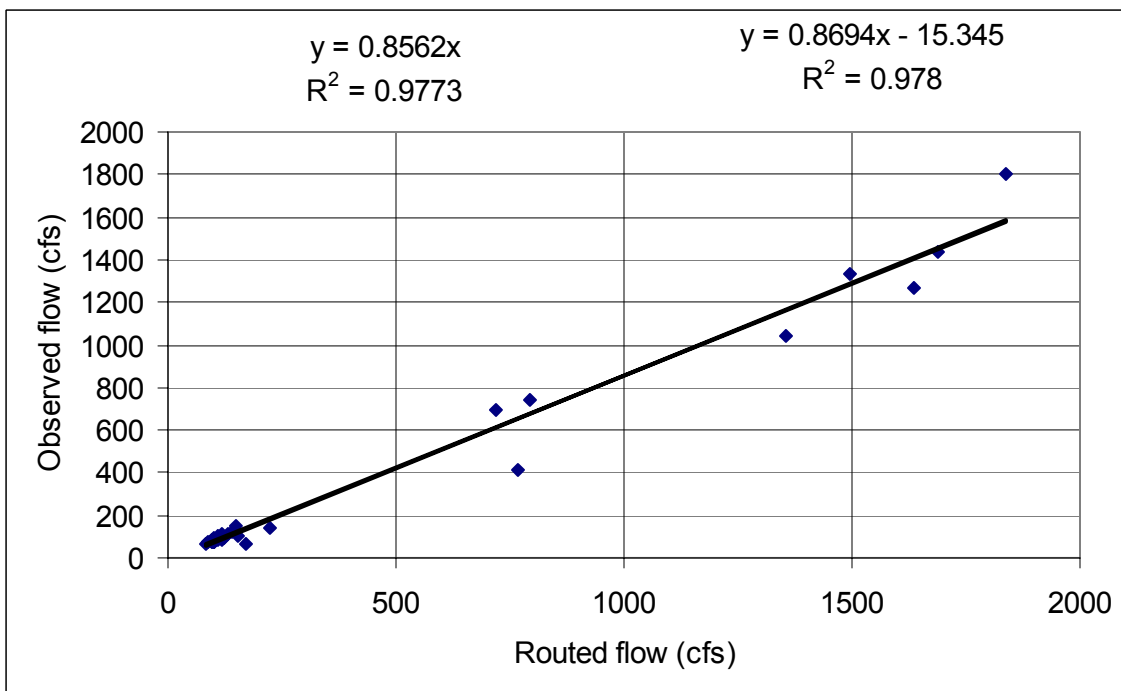
Graph 171. Cross section area versus discharge, Rio Grande at El Paso, Texas.



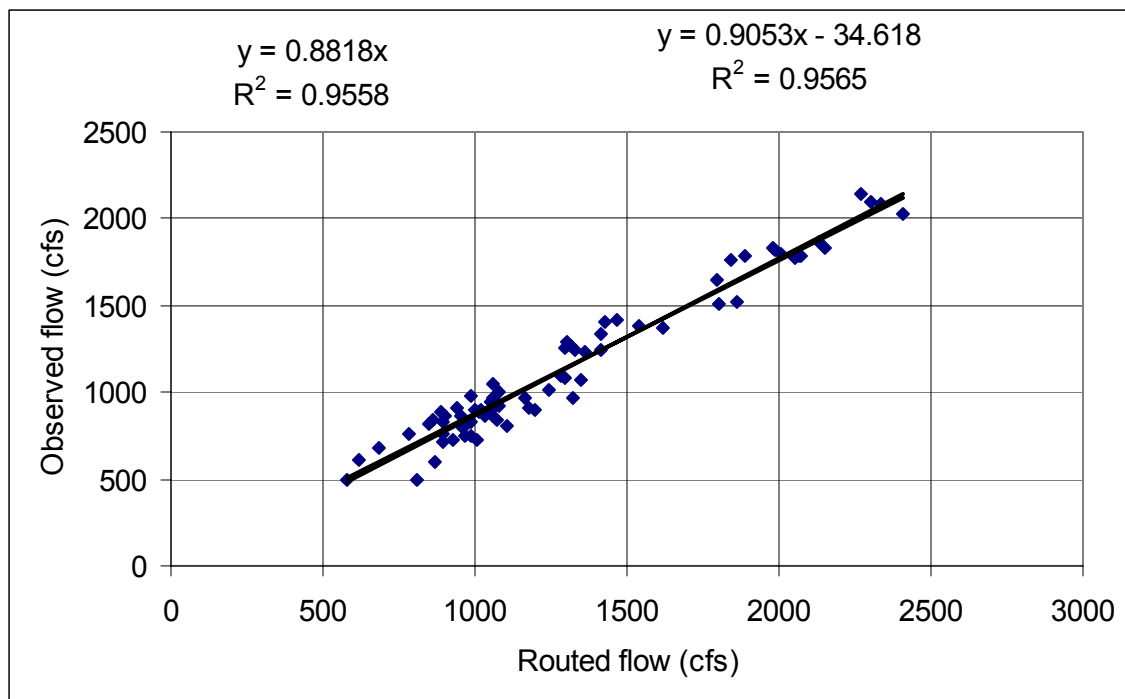
Graph 172. Travel time versus discharge, Rio Grande below Mesilla Dam to El Paso (based on gage at El Paso).



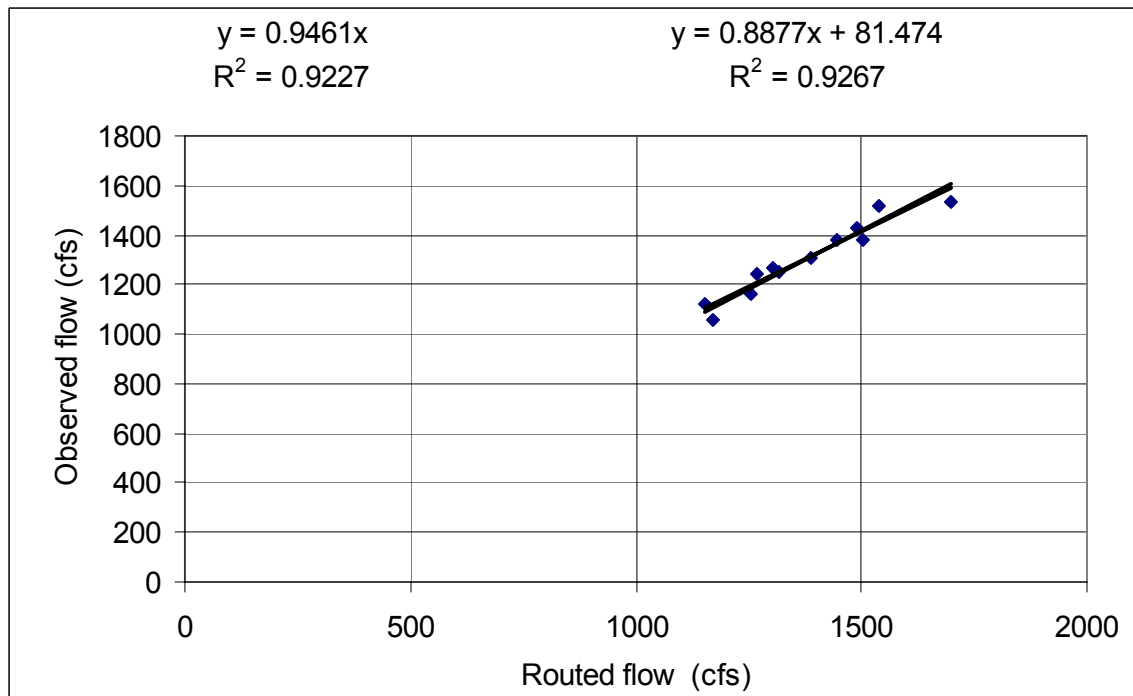
Graph 173. Observed flow versus routed flow, filtered for losses, Rio Grande below Mesilla Dam to El Paso, January 1986-98.



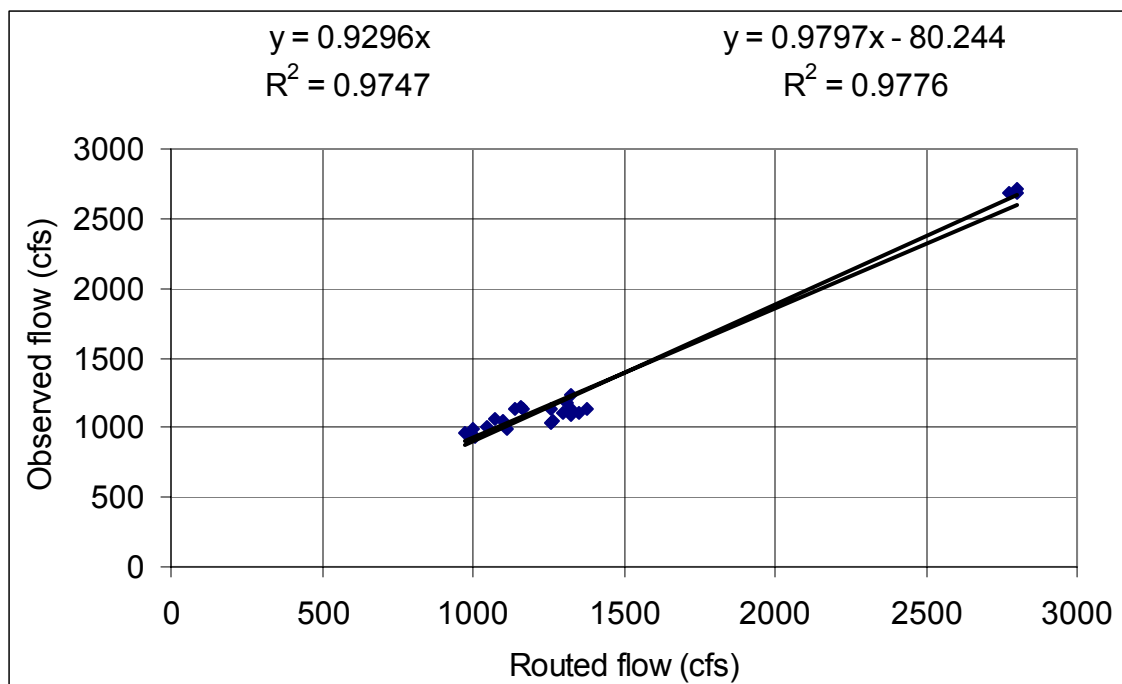
Graph 174. Observed flow versus routed flow, filtered for losses, Rio Grande below Mesilla Dam to El Paso, February 1986-98.



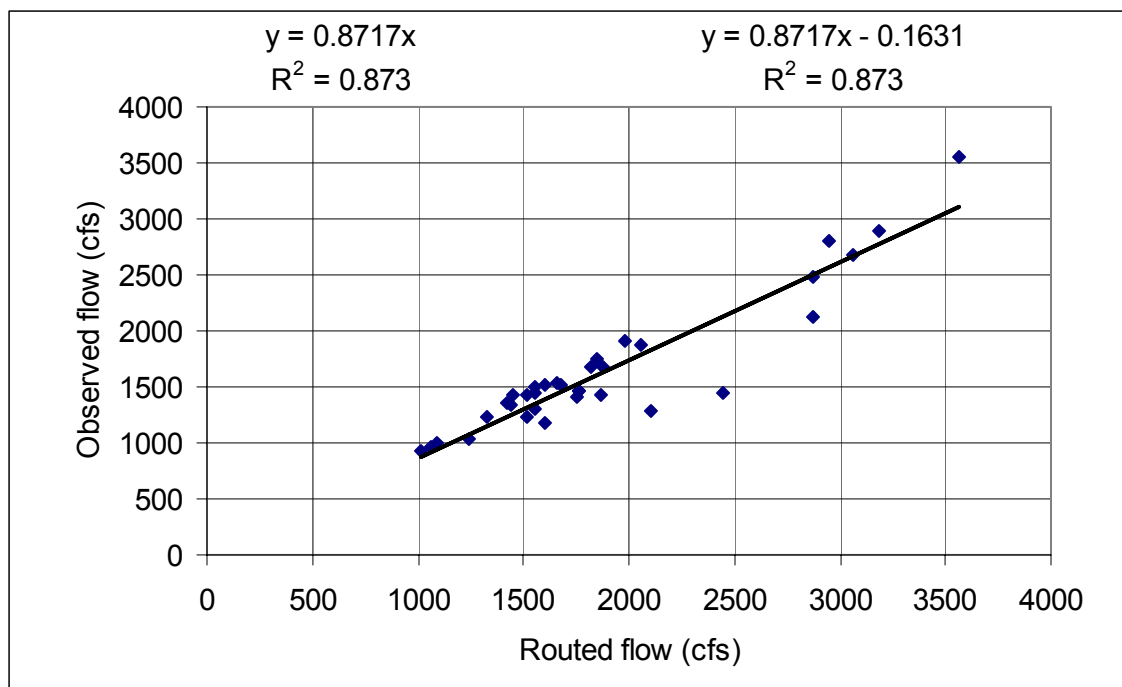
Graph 175. Observed flow versus routed flow, filtered for losses, Rio Grande below Mesilla Dam to El Paso, March 1986-98.



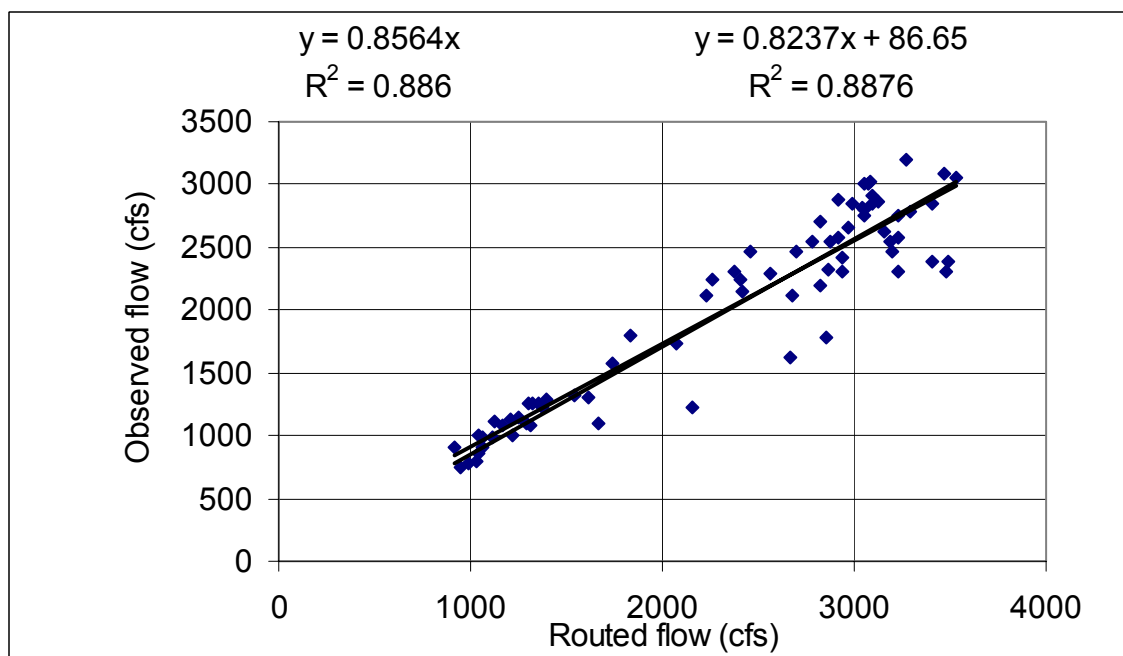
Graph 176. Observed flow versus routed flow, filtered for losses, Rio Grande below Mesilla Dam to El Paso, April 1986-98.



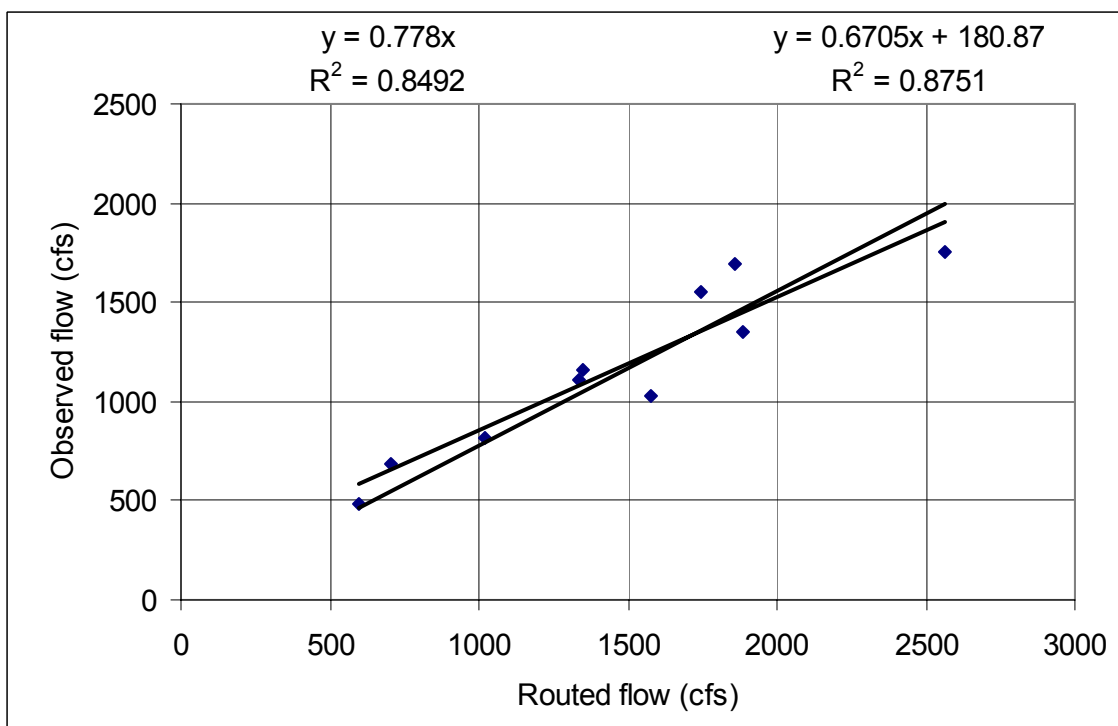
Graph 177. Observed flow versus routed flow, filtered for losses, Rio Grande below Mesilla Dam to El Paso, May 1986-98.



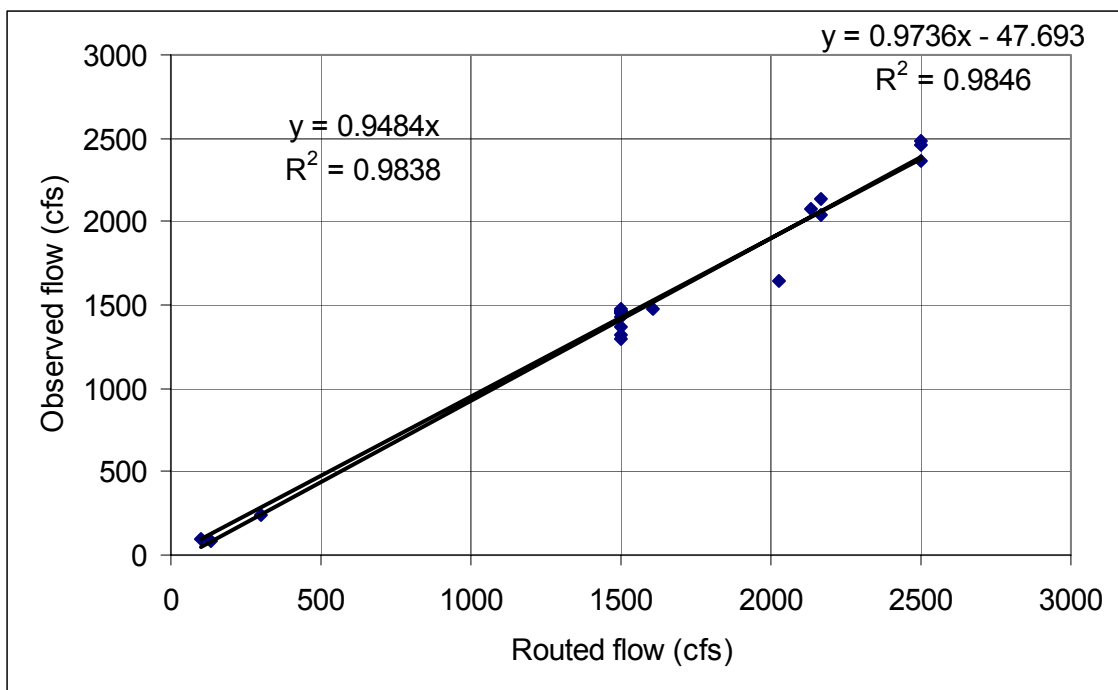
Graph 178. Observed flow versus routed flow, filtered for losses, Rio Grande below Mesilla Dam to El Paso, June 1986-98.



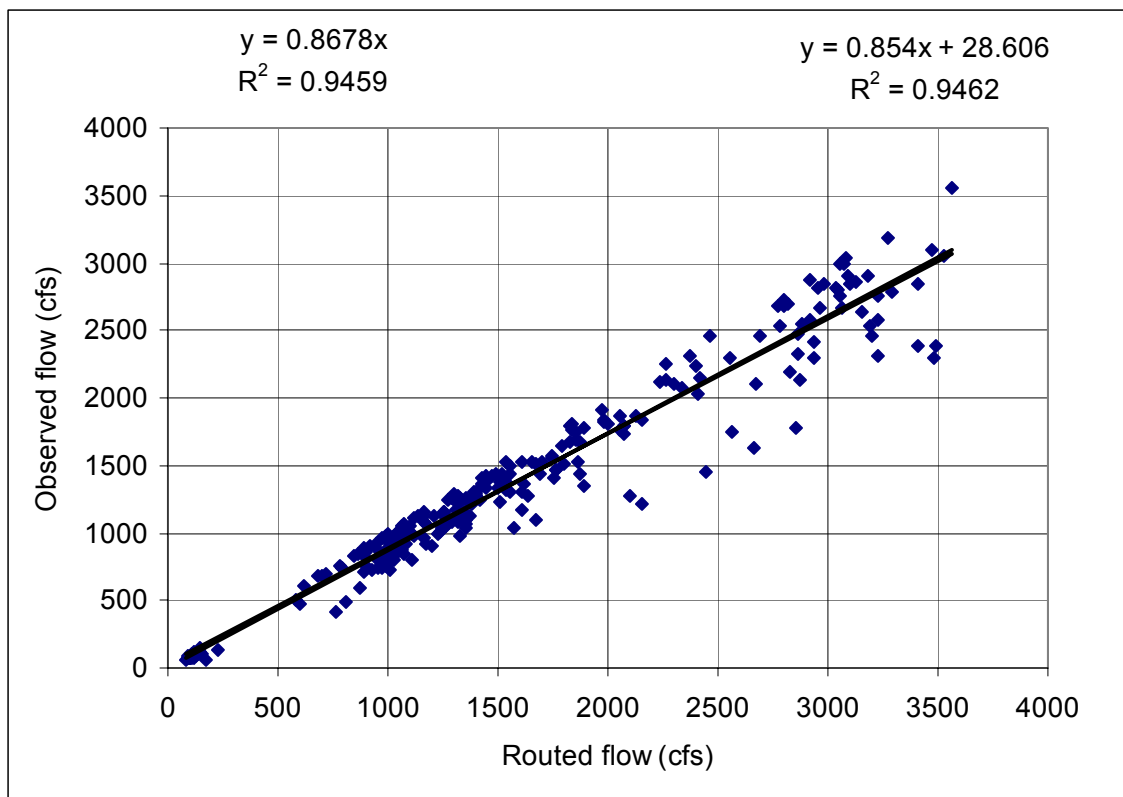
Graph 179. Observed flow versus routed flow, filtered for losses, Rio Grande below Mesilla Dam to El Paso, July 1986-98.



Graph 180. Observed flow versus routed flow, filtered for losses, Rio Grande below Mesilla Dam to El Paso, August 1986-98.



Graph 181. Observed flow versus routed flow, filtered for losses, Rio Grande below Mesilla Dam to El Paso, November-January 1986-98.



Graph 182. Observed flow versus routed flow, filtered for losses, Rio Grande below Mesilla Dam to El Paso, February-October 1986-98.